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URINOUS ECZEMA.*

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UNDER the above term, I have to describe a disease manifested by a peculiar condition of the skin, which I have seen a few times during my experience, and which is shown in the photograph.

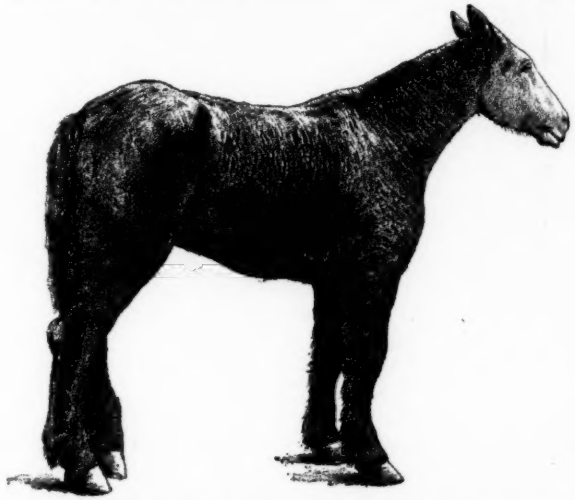


FIG. 1.—Appearance of the mare—mane, body, and legs clipped.

The first case occurred many years ago, and was seen in consultation with Mr. Aitken, V.S., Dalkeith. A young cart horse

* Read before the Lancashire Veterinary Association, September 9th.

was said not to have urinated for three months, and, in addition to the symptoms about to be described, there was a constant flow, from the lower part of the mane, of a urinary fluid, which flowed over the shoulder and down the limb. The excretion had a strong urinary and ammoniacal odour. The horse either died or was destroyed, and unfortunately no *post-mortem* examination was made.

The second case was that of an old circus horse belonging to Mr. Newsome. This horse continually sweated an ammoniacal

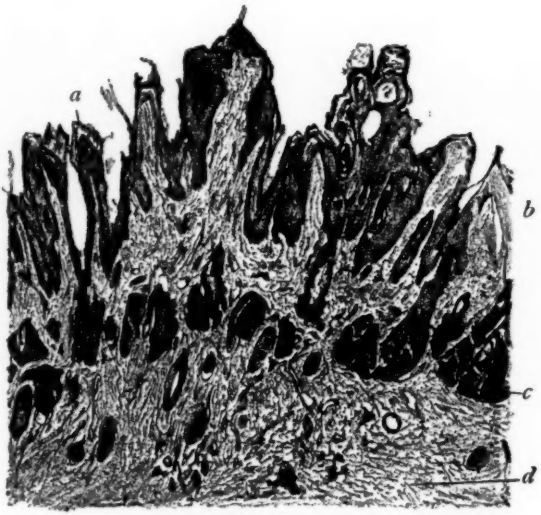


FIG. 2.—SKIN. Vertico-transverse section of skin. (× 20.)

a. Rete mucosum.
b. Remainder of desquamated superficial layers of epidermis.
c. Hypertrophied sebaceous glands.
d. Cutis vera distended and softened.

fluid from both flanks, and the skin of his legs was very much thickened; he passed small quantities of urine, which had a thick, mucilaginous character; he ate fairly well, but gradually became emaciated. The horse leaving Edinburgh alive, I had no chance of making a *post-mortem* examination, but I know that he died shortly after I had seen him.

I next had an opportunity of examining the kidneys of an animal which had presented the symptoms of the disease, but which I did

not see in life. The kidneys presented all the appearances shown in the photographs.

The animal from which the photographic illustrations were taken, was treated by my son and myself from the commencement of her illness—from 11th December, 1890, to 6th March, 1891—until she was destroyed at the College.

At first she presented the symptoms of Scarlatina, from which she apparently recovered; but before being put to work the

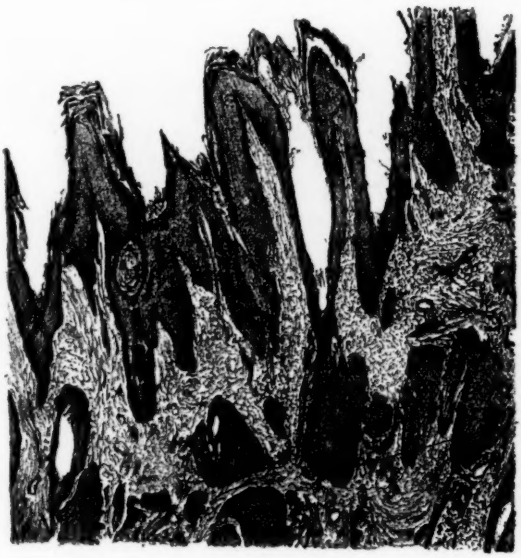


FIG. 3.—SKIN. Under a higher power. (× 40.)
a. Supposed altered duct of sudoriferous gland.

appearance of the body and extremities, shown in Fig. 1, began to manifest itself, although she fed well and kept up her condition, —in fact, at one time improved in condition and became almost fat. About a year before this final illness she had an attack of Azoturia.

The symptoms may be described as follows:—1st. Swelling of the extremities, from the surface of which a fluid having a fœtid and urinary smell constantly exuded; the skin became excoriated, particularly at the flexures of the joints, upon the inner surface of

the thighs, and between the forearms and chest; an eruption then appeared on the whole surface of the body, including head and tail, from which issued a fluid which concreted into thick squamæ or crusts. These adhered to the hair, and were almost irremoveable with comb or brush—in fact, they could scarcely be removed even by washing with alkaline fluids. No amount of grooming could keep the animal clean, for as soon as one set of crusts were removed others rapidly formed; the whole surface of the skin became slightly swollen, and tender to the touch. There was a

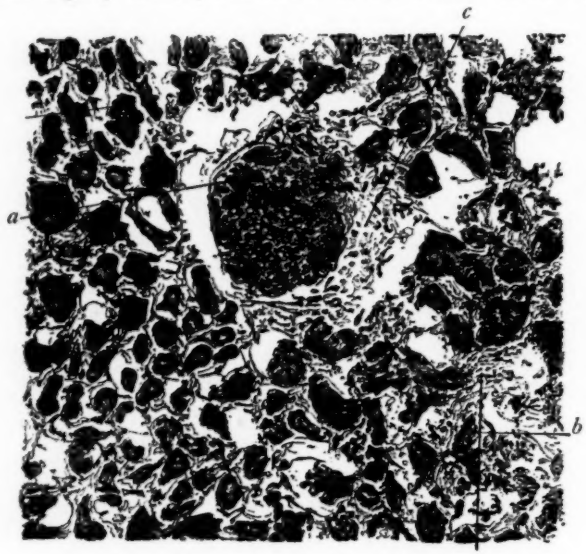


FIG. 4.—KIDNEY. Cortical part. (× 350.)

a. Malpighian body.
b. Transverse section of secreting tubules with altered epithelium.
c. Connective tissue slightly increased; rich in cell elements.

disinclination to movement, and when the animal was made to move, it did so very stiffly, and gave evidence of pain, arising from friction of the excoriated surfaces and movement of the rigid swollen and tender skin; the limbs became more pronouncedly swollen, but at no time was the swelling very great. Pulse and temperature very variable.

Throughout the course of the disease, and in all cases seen by me the bowels were rather constipated, the fæces being hard, dry, and pellety, and covered over with a slight mucosity.

On examination of the liver, kidneys, and skin—the only organs which gave evidence of disease on *post-mortem* examination—the liver had a soft and degenerated appearance, the kidneys were slightly enlarged, soft, and pale, the skin thickened.

The Skin.—The surface layers of the epidermis were largely desquamated, and the papillæ of the derma hypertrophied. There was enlargement of the sebaceous follicles, which were blocked with cells; a few of the sudoriferous glands were also enlarged, but the vascularity of the skin was only slightly increased. There

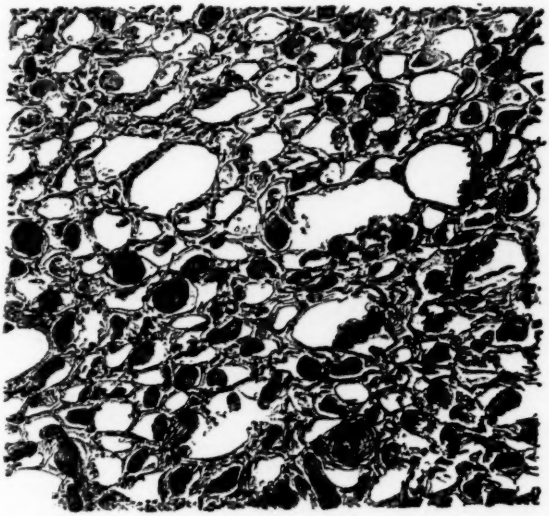


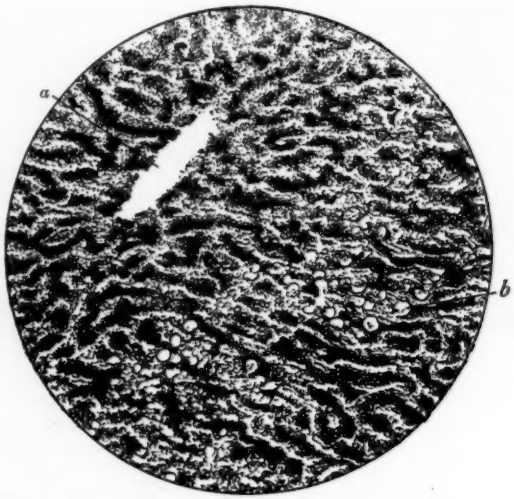
FIG. 5.—KIDNEY. Boundary layer transverse to tubules, which are partly denuded of epithelium, some of which may be accidental, but remaining cells are similarly changed to above. (× 350.)

were a few enlarged lymphatics here and there, and the subcutaneous tissue was open, loose, and contained much serum.

On analysis of the cutaneous excretion, it was found that it contained large quantities of nitrogen in the form of ammonia, a small proportion as urea, a proportion as albuminoids, about 5 per cent. of fat, and also salines in the form of phosphate, sulphate, and chloride of sodium, with a little chloride of potassium, and the proportion of water as low as 10 per cent. It was noticed that there was a large proportion of volatile butyric, and a small amount

of lactic acid. It will be seen from the photo-micrographs that the papillæ of the skin are hypertrophied and covered only by the deep layer of the epidermis, the superficial ones having been almost completely desquamated. This points to the fact that there was an exudation from the whole skin surface, irrespective of gland openings.

The Kidneys.—The changes in the kidneys were those of a chronic character, the degeneration universal, but most advanced in the secretory portion. The connective tissue throughout the



* FIG. 6.—LIVER. Cells increased in granularity, and showing fatty degeneration; destruction greatest in periphery of lobules. (× 300.)

a. Hepatic vein.
b. Periphery of lobule where degeneration is greatest.

kidneys was but slightly increased, and that was of an embryonic type. No marked changes were observed in the nervous tissue.

The Liver.—The change in the cells, which is universal throughout the liver, is much more pronounced towards and at the periphery of the lobules. This leads to the inference that the morbid material enters the liver by the interlobular vessels; that is to say, the

* The photo-micrographs of Skin, Kidneys, and Liver are by Dr. James Hunter, Professor of Physiology, New Veterinary College, from sections by Professor W. O. Williams.

degeneration is due to something conveyed to the liver by the blood-vessels rather than from any initial change in the organ itself.

FIG. 7.—LIVER. Showing several lobules undergoing the same changes as shown in Fig. 6. (× 15.)

ANALYSIS OF SWEAT BY PROFESSOR IVISON MACADAM.

Fat *	14·93 per cent.
Butyric acid †	26·97 „
Lactic acid	1·72 „
Ammonia (volatile) ‡	3·55 „
Substances soluble in alcohol and soluble in water §	8·01 „
Substances soluble in alcohol, but insoluble in water ‖	1·12 „

* Consisting mostly of glycerides of oleic and palmitic acid.
† Partly in combination with ammonia.
‡ In combination as butyrate of ammonia.

§ Saline matter	21·41 per cent.
Organic and volatile matter	78·59 „
	100·00

Oxide of calcium	1·16 per cent.
Oxide of magnesia	0·15 „
Potassic oxide	3·08 „
Sodic oxide	14·28 „
Nitrogen	13·69 „

Oxides mostly present as soaps.

‖ Contains no nitrogen; neutral to test papers and purely organic in character, mostly sulphur (highly smelling compounds).

Substances soluble in water, but not in alcohol ¶	7·59 per cent.
Substances insoluble in water and alcohol ** ..	29·28 „
Water	6·79 „
	99·96

ANALYSIS OF THE URINE, BY PROFESSOR IVISON MACADAM.

The urine, except under the action of strong diuretics, was scanty; had the appearance of linseed oil, and on analysis gave the following result :—

Specific gravity at 60° = Water 1000	.. ..	1041·48
Per 1000 parts :—		
Total solid matter		105·810
Organic constituents		67·750
Saline matters		38·060
Chlorine	1·421	
Potassic oxide	15 762	
Sodic oxide	·921	
Calcic oxide	4·142	
Magnesic oxide	1·962	
Phosphoric anhyd.	2·962	
Sulphuric anhyd.	1·419	
Carbonic anhyd.	9·321	
Undetermined and loss	·050	
Urea		8·227
Albumen (coagulated by heat)		1·216
Mucus		46·431
Fixed acid = Lactic acid		11·610
Hippuric acid		·212

¶ Saline matter	25·14 per cent.
Organic matter	78·80 „
	100·00

Phosphoric anhydride ..	7·45 per cent.
Calcic oxide	9·31 „
Magnesic oxide	2·09 „
Potassic oxide	1·14 „
Sodic oxide	2·81 „
Chlorine	1·36 „
Sulphuric anhydride ..	0·24 „
Nitrogen	10·23 „

Calcium, evidently combined with organic acids, chlorine with sodium, potassium and magnesium as phosphates, nitrogen as soluble albuminates, etc.

** Saline matter	4·23 per cent.
Organic matter	95·77 „
	100·00

Nitrogen, 14·87 per cent.

Sand	2·11 per cent.
Oxide of iron	0·12 „
Phosphoric anhydride ..	0·83 „
Calcic oxide	1·01 „
Magnesic oxide	0·14 „

Phosphoric acid, present as calcium and magnesium phosphates, nitrogen mostly as albumen.

It will be noticed that the urea is much diminished in quantity (about 31·0 being the normal), and that the quantity of mucus is enormous. This condition of the urine was permanent throughout the disease. Potassium, it will be seen, is very abundant.

TREATMENT.

Various remedies have been tried in this disease, but so far the results have not been satisfactory. The preparations of arsenic, as contained in Fowler's and Donovan's solutions, have been given extensively without beneficial results; the salts of potash, nitrate, iodide, and chlorate; tonics, both vegetable and mineral, have proved non-affective. Symptoms, however, have been alleviated, and in one case a permanent cure has been established, by the repeated administration of purgative medicine. At first the bowels should be freely moved with aloes, and the aperient action maintained by the daily administration of sulphate of magnesia in about four ounce doses per day, or in sufficient quantity to keep the fæces in a pultaceous condition. By this method of treatment the congestion of the kidneys and liver is relieved, and the chances of at least further organic changes in these glands prevented.

With regard to local treatment, it can be palliative only: the diseased condition of the skin being secondary, and due to the irritation of the products of its vicarious function, the parts should be kept clean, and the irritation resulting from the exposure of the raw surfaces kept at a minimum by suitable dressing.

Once a week, or oftener, if necessary, the whole surface of the body should be dressed with an emulsion of olive oil, potash and water, and containing creosote or carbolic acid; this dressing is to be washed off with soap and warm water in about twenty-four hours after application, and the skin thoroughly cleansed. Then dry dressings of carbolised chalk, iodoform and chalk, or some other absorbent dressing should be sprinkled freely over the whole surface, but more particularly over the flexures of the limbs and other excoriated spots. The diet should be generous but not stimulating. If in season, green food only should be given.

FOOT-ROT IN SHEEP—ITS RELATION TO THE PRESENCE OF THE SYMBIOTES SPATHIFERUS (OVIS).

BY THOS. B. GOODALL, F.R.C.V.S., CHRISTCHURCH, HANTS.

SYMBIOTES SPATHIFERUS (OVIS).

I HAVE searched in vain for any record of this parasite having been found in this country. It was discovered by Zürn, of Leipzic, in 1874, and by Schleg in 1877, but its presence in this country appears to have been overlooked.

A question was asked by Dr. Fleming, in the recent examination for the Fellowship Degree, "Is there a contagious Foot-rot of sheep?" Having studied the journal of the Royal Agricultural Society, I knew that experiments had been conducted at the Royal Veterinary College with negative results; but my curiosity was aroused, and I examined closely many feet of sheep that had been affected with the disease, which were sent me from a slaughter-house. These were all unsatisfactory. I could detect nothing more than the usual lesions attending severe injuries to the feet.

At the beginning of June I took up an apparently healthy foot, and with my lens found an acarus on it.

I next, on June 19th, applied to a neighbouring farmer, who had a flock of sheep badly affected, for *permission to examine them*. I naturally selected the bad ones first, but could find nothing; then I noticed one of the sheep shaking its foot, and I found several of these parasites, which, by comparing with Dr. Fleming's description of Symbiotes in his book, "Veterinary Sanitary Science and Police," I had no difficulty in identifying.

Zürn is reported to have found nearly as many males as females; my experience is that there are somewhere about a dozen females to one male. In all affected feet examined by me, there have been scores of females and immature hexapods; but it is very difficult to obtain a *male* fully developed.

I have only found the peculiar distinctive caudal appendages on one or two specimens; in others there are the four setæ.

The parasites are found first in the fossa in the skin of the interdigital space, immediately in front of the horny structure that passes from one digit to the other at the heel of the foot. They then appear to spread up the anterior part of the interdigital space, and then to collect in groups on the patch of bare skin that surrounds the orifice of the interdigital sac; then there is no doubt that this sac is also invaded by the parasite. I have not yet found any higher on the limb than this. I have searched carefully under the pasterns, but unsuccessfully. (Since the above went to press, I have found them under the pasterns.)

In those cases where the inflammatory action was high, and where the fungous growths were found, and the discharge was profuse, the acaridæ were not so numerous, or not so easily found as in the primary stages.

This is my experience of other forms of Scabies.

Since my first discovery of the acarus, on June 19th, I have examined the feet of many sheep, and it is really very common; it is only a matter of surprise that it has never been recorded before.

There are certain fields, particularly old park-lands, and always on poor sandy soil, which appear to retain the acarus in some stage, for when sheep are kept in them they always become affected; whereas on chalk or clay they appear to be immune, or nearly so, and this appears to me to be a feasible reason why the sheep sent to the Veterinary College made a recovery.

I have found acaridæ of various kinds on this poor, sandy soil—on the field-vole, rat, in birds' nests, etc., etc., which seems to point to the probability of its being favourable for the life and retention of these minute organisms.

The acaridæ are passed from one sheep to another in the early stages of the disease, before it is noticed or suspected. At this stage there is no lameness, and the shepherd would overlook, or ignore the presence of a few dry scales, which is all that is to be seen. It is probable that the acaridæ may continue *on* the skin for some considerable time in warm, dry weather, without giving rise to any serious symptoms; but with the advent of cold and wet they probably seek shelter in the orifices of the sebaceous glands, of the skin of the interdigital spaces, and in the interdigital sac. It is not nearly so contagious, if at all, when the inflammatory or purulent stage has been established.

In mounting my specimens, I found that the first contact with glycerine killed them, but that they retained their vitality for some time in Canada balsam.

The best way to obtain a good view of these creatures alive, is to make a very thin ring of Canada balsam on the glass slide, place the acaridæ within the ring, and lay a small half-inch cover glass lightly over the top. Their movements may thus be watched for some time, and as the glass falls gradually on them, they almost invariably come into good position; whereas, when they are placed in glycerine they often double their legs under them. But both glycerine and Canada balsam appears to obliterate the many hair-like appendages. These are always seen best in the living or dry specimens.

The two drawings that I am forwarding with this were mounted in Canada balsam.

I also found that a very weak solution of perchloride of mercury caused instant death. From this I should infer that a dressing of carbolised glycerine, or a weak solution of perchloride of mercury, to all feet, would destroy the parasite. I am devising and elaborating a simple method for the destruction of the parasite, and the prevention of its attack.

It is interesting to know how this and other forms of acaridæ are conveyed from one host to another; it is not always by being brushed off by the grass—indeed, this is an almost impossible

thing to happen, as may be proved by the difficulty of scraping them off the skin with a knife or other instrument.

These creatures have regular *carriers.* By the bell-shaped sucker appendages of the forefeet, they can, with marvellous rapidity, affix themselves to the body of an insect; and those insects that prey in another way in the body of the host, *carry* them from one host to another.

I have witnessed this in the case of the acaridæ (Gamasidæ) that are to be found on dung, or on the putrid skins of dead animals. They affix themselves with the rapidity of thought to the bodies of the Necrophorus, Geotruphes, and other beetles, and to the Scatophagus, and some other flies. They leave these insects when they alight on a fresh food-supply; there they immediately *pair,* the females deposit their eggs, and the young have their food-supply at hand; when it is finished, they may be seen in clusters on the surface of the ground, waiting for the arrival of their conveyance. The above are *facts* regarding the common brown Gamasus found on dung, etc., and I have witnessed these actions.

This becomes intensely interesting when I record a fact with reference to this Symbiot of the sheep.

Whilst I was examining the feet of the sheep on June 19th (an intensely hot day), we were plagued and tormented by that troublesome biting fly, the *Stomoxys calcitrans.* I captured a few of these for dissections of their mouths, and on one of them I found one of these acaridæ. Whether this got there by chance—which I have no belief in in nature—or whether this fly is the mode of conveyance from one host to another, will be an interesting point to determine.

If any importance is likely to be attached to this slight (?) discovery, it would lead us to suppose that the acari (probably fertile females) are carried from host to host during the hot weather, but that they give rise to no abnormal symptoms until, with the advent of cold and wet, they seek the shelter of the gland orifices.

Moral: Farmers should dress the feet of all sheep with one of the dressings I have suggested, somewhere about *September,* before the advent of cold weather.

From evidence I have gleaned, and which I will deal with later when describing symptoms, there is good reason to assume that these acaridæ are the exciting cause of an inflammatory action in the sebaceous glands of the skin in the interdigital space and in the interdigital sac (this will be better understood by reference to my description of the conformation of the sheep's foot), and possibly, also, in the horn-secreting structures; and that this causes a separation of the upper part of the "horn" from the "cutis,"

generally at the spot where the hard, horny covering of the toe terminates for the softer horn of the heel; *which corresponds exactly with the navicular joint.* On sandy soils particularly, from the accumulation of "grit" in this fissure, suppuration soon supervenes; and then the ruthless application of the shepherd's knife, and strong caustic dressings, complete the establishment of an almost incurable disease of the foot.

If then, we have in this parasite a latent cause of an inflammatory action, the results of which are familiar to us under the name of "Foot-rot," its removal, which may be easily effected by a periodical dressing of the feet in a bath or trough with one of the dressings I have suggested, should be the object of the veterinary surgeon and the agriculturist.

It would, perhaps, be advisable to give a brief description of Foot-rot as generally understood, also a brief outline of the structure of the foot of the sheep, and then give the probable sequence of symptoms, the various stages being seen by me on the feet of different sheep.

To verify, or contradict this, I have purchased two sheep on which I only found a few of the parasites, and I am taking occasional notes of the appearance of the feet, which I shall hope to publish at a later date.

Professor Brown, as long ago as 1864, wrote that "very little appears to have been ascertained concerning the essential characters which distinguish Foot-rot from other diseases of the foot of the sheep;" and he adds, "should farmers consider this admission a reflection upon veterinary science, they are requested to pardon the suggestion that veterinary science has had very little to do with the matter."

This is equally true to-day—the shepherd is still the great authority; he pares away, dresses, and treats the feet of all sheep that are lame, from whatever cause. Each farmer has his own specific remedy, and all cases of lameness in the feet of the sheep are treated in the same way. The horny coverings are pared away, a strong caustic is applied to the tender vascular parts, intense inflammation is induced, the secreting functions of the hoof are destroyed; and a fungous mass takes the place of the normal horn.

But professional advice is never sought in these cases, and, therefore, there has heretofore been no inducement held out to the student or practitioner of veterinary science to devote his time to a study of the structure of the foot of the sheep, nor of the differential characters of the diseases to which it is liable; and unless anyone with the necessary knowledge likes to devote his spare time to striking out on an unbeaten track, and ascertain for himself

the facts in relation to this disease, its characters and treatment would apparently remain for ever a mystery; and the agricultural world would be content to go on grumbling and "quacking," without getting any nearer to the truth.

What is Foot-rot? Before this question can be answered satisfactorily, it is necessary that some of the physiological and anatomical peculiarities of the foot of the sheep be explained. There has been no inducement offered to veterinary surgeons to devote much time to this, and it is only out of sheer love of delving into the great mysterious workings of nature that I have given this my serious consideration.

The foot of the sheep is covered by horn of two *densities*. The *hard* horn only covers the toes, and extends back nearly to the heel on the outer face, and about half of the way back on the *inner* face, where, at its lower margin it curves inwards. In some feet the line of demarcation between the hard and soft horn is very distinct. There is a distinct furrow running down the foot from coronet to sole, separating the hard horn at the toe from the soft, pliable, almost spongy horn that covers the heels and quarters. This groove corresponds *exactly* with the navicular joint. Thus the pedal bone is enveloped in a hard, resisting case, and the tendinous and spongy material of the heels is protected by a soft and yielding horn, which is continued on to the sole of the foot. The hard horn of the toes, at its plantar edge, curves over the sole. The soft horn of the quarters *is continuous across the interdigital space at its hinder part.* A transverse section of the foot at this part has many points of resemblance to the "frog" of the horse's foot. The interdigital space, at its hinder part, from the point where the groove separates the hard from the soft horn in the inner face of the digits, is covered with horn.

It is of the utmost importance to keep in mind this conformation of the horny case of the foot, when considering the various manners in which the foot may become the seat of injury or disease.

Now let us take our attention to the integumentary envelope of the parts immediately above the foot. The skin at the anterior part of the interdigital space is thick, and studded with yellow glandular bodies. This is reflected into a curved *cul-de-sac* at the front of the foot, the orifice of which is about an inch from the hoof. The skin for about half-an-inch round this orifice is almost bare, that is, it has but few hairs on it. There is also a slight depression or fossa, in the hinder part of the interdigital space immediately in front of the connecting horn of the two digits.

This *cul-de-sac* (or interungulate gland, as it has been termed, though interdigital sac would be the more proper expression) per-

forms a most important function; a section of its basement structure shows it to be studded thickly with yellow glandular bodies, like the Meibomian glands of the eye-lids, and these glands normally secrete a clear, transparent *fluid*, which, on exposure to the air, soon solidifies like transparent wax. There are also hairs growing on the inner side of this sac, which are generally loose; and there is nearly always a small tuft protruding through the orifice, which seems to act as a protection. The sac, from its commencement, takes a downward course, and then curves upwards and backwards.

In health, then, there is a clear sebaceous fluid secreted from the glands of the sac, and the integument in the anterior part of the interdigital space.

This conformation of the foot and the integumentary structures immediately above it, is wisely adapted for the rocky, mountainous regions which are the normal habitations of the sheep; but in the abnormal environment in which it is placed by man, its very conformation renders it peculiarly liable to many forms of injury, which are followed by disease.

It is not at all unusual to find "grit" lodged in the groove separating the hard from the soft horn; as this corresponds exactly with the navicular joint, we may easily imagine that there may be a slight movement here in locomotion. The "grit" sets up inflammatory action, which induces lameness; the shepherd pares away the horn, and applies his caustic dressing, which destroys or impairs the horn-secreting membrane; and true horn never grows here again, but in its place a dense fibrous mass, and at the toe of the digit a number of fungoid growths. This is termed Foot-rot.

Again, after a long journey on a dusty road, the glandular orifices become clogged, the sebaceous secretion is penned back. Inflammation of the glandular structures in the interdigital spaces, and in the interdigital sac, is the consequence. This causes an abnormal pressure on the horn-secreting membrane at the coronets, with perhaps a little separation. The shepherd pares it all away and applies his caustic, with the only possible result of a life-long abnormality. All this is termed Foot-rot, and enough to make them rot too!

If, instead of this, farmers were to have the feet of their sheep treated as rationally as the feet of other animals, it would save them an incalculable loss, and the sheep an infinity of suffering. For, if the feet in these cases were thoroughly scraped and cleansed, and a mild astringent lotion applied (the treatment applied to other animals), a cure would be effected. But though the greater part of a flock might be affected from such causes as I have instanced,

we could not designate it *contagious*, and we can quite understand how the non-interference with the feet of the sheep at the College led to their recovery.

But the disease of the foot induced by the presence of the Symbiot is undoubtedly contagious, and the contagion is carried from one sheep to another in its early stages, when the presence of the parasite is not suspected; or, later on, by the paring of the feet of the sheep *in the pens*, the acaridæ are spread broad-cast over the land where the sheep will walk. I would suggest that the feet of all sheep should be cleansed on some *dry litter outside the pens*, which should be *burned* after every operation; this would be a simple way of destroying a very fruitful source of contagion.

I will conclude this with what I believe to be the sequence of symptoms, which I gather from the examination of the feet of several sheep in different affected herds, where I have found this parasite—the Symbiotes Spathiferus, and later, I hope to publish the record of the symptoms in the two sheep I have under observation on my own premises. I have spent much time in prosecuting this search, with the view of turning it to the advantage of the agricultural community.

The first symptom (and this is when it would be entirely overlooked by the shepherd and farmer, and when it is really most contagious) is a slight occasional shaking of the foot. There is no lameness for some considerable time, especially in warm, dry weather; and to a casual observer, nothing would be noticed unusual in the appearance of the foot. At this stage there will be noticed dry epidermic scales on the skin in the interdigital space (always first in the fossa, immediately in front of the horny "bridge" at the heels.

Choose a still, bright day, and take a scraping of these scales on a piece of dark-coloured paper, and expose them to the sun's rays, and they will be found teeming with the acaridæ. I can find them now, with the naked eye, on the foot, by opening the digits and exposing the skin to the sun.

The next stage is small papular eruptions. Active inflammation of the integumentary structures soon supervenes, quickly followed by fungous growths of the size of grains of corn, which hang down between the digits. This inflammatory action extends into the interdigital sac, and the character of the secretion is altered. The walls of the sac are thickened, and the secretions are found in little, hard, transparent nodules in the sac, later on becoming purulent.

Next there is detachment of horn at the upper part of the groove separating the hard from the soft horn on the inner face of the digit, due to the inflammatory action in the integument above,

which the shepherd pares away, and then applies his caustic. I have obtained the parasites from the interdigital sac.*

It may, perhaps, be premature to attribute to this parasite the blame of being the cause of contagious Foot-rot; but hitherto I have always been able to find it in the feet of sheep in an affected flock, and on land subject to the production of the disease, and I have been unable to trace any sign of it in the feet of other sheep.

The points to bear in mind are, that it would be most easily spread in its primary stages, and later, by the feet of affected sheep being pared in the pens.

ACTINOMYCOSIS.†

BY PROFESSOR CROOKSHANK, M.B., KING'S COLLEGE, LONDON.

I WAS invited by the Council of this Section to open a discussion "on diseases communicable from animals to man, and *vice versa*," omitting any diseases which might be selected as separate subjects for discussion. Under these circumstances, I thought it would be more satisfactory to deal exclusively with a disease common to man and cattle, which has interested me for some years more than any other. I refer to human and bovine Actinomycosis.

NOT A NEW DISEASE.

Actinomycosis has been frequently referred to as a new disease. Even so recently as in December, 1889, Professor Byron, Director of the Bacteriological Laboratory of New York, in describing a case in man that came under his observation, spoke of it as a new infectious disease. It is not, however, thus correctly described, for the various manifestations of it have been met with for more than half a century, though misunderstood and misnamed.

From contemporary literature there can be no doubt that Actinomycosis was very prevalent in Scotland in 1827-1839, and veterinary surgeons have long been familiar with certain morbid conditions in cattle known as wens, clyers or crewels, sitfasts, scrofulous, tubercular or strumous abscesses, polypus or lymphoma or simply tumour of the throat, cancer of the tongue, scirrhous tongue, indurated tongue, ulcerated tongue, cancer of the jaw, bone-tubercle, osteo-sarcoma, fibro-plastic degeneration, spina-ventosa and carcinoma. But it is only comparatively recently that, owing principally to the work of Italian and German pathologists,

* I shall have some important modifications to make regarding the sequence of symptoms, when I publish the record of the examinations of the sheep I have under observation.

† Read at the International Congress of Hygiene and Demography, August 14th.

it has been found that these terms have been mis-applied to the new growth associated with a highly characteristic vegetable micro-parasite, the ray-fungus or *actinomyces.*

Prevalence in England.

Six years ago, after studying Actinomycosis in the pathological laboratory of Professor Johne, of Dresden—well known for his own researches on this subject, I began to collect on my return to England all the information and material I could obtain of both human and bovine cases in this country. I found that the disease was not generally recognised as a common affection in cattle, in spite of the interest excited by the work of Dr. Fleming, to whom is due the great credit of first recognising a case in this country, and of bringing the work of the continental investigators prominently before the veterinary and medical professions. In 1887 I investigated a disease prevailing in Norfolk, and in the following year outbreaks which occurred in Essex, Hertfordshire, Cambridgeshire and Middlesex. In the Norfolk outbreak I found on one farm 8 per cent. of the beasts affected with the so-called "wens" or "sitfasts," which I proved by microscopical examination to be cases of Actinomycosis. These growths have been regarded from casual inspection as the result of strumous or scrofulous inflammation, but in all the specimens of wens which I have received from this country and the colonies, I have been able to demonstrate the presence of the ray-fungus.

A case of pulmonary Actinomycosis with grape-like growths on the pleura convinced me that wens were not the only form of this disease which had been lost sight of under the designation of Tuberculosis. In the morbid specimens to which I would draw your attention, you will see appearances which have been invariably attributed in this country to Tuberculosis, and will continue to be if we rely on a hasty examination in the slaughter-house.

Its Manifestations.

I shall now proceed to refer to the various manifestations of this disease, and to illustrate my remarks by morbid specimens from my own collection and by photographs.

Taking first of all the digestive system we find the disease attacking:—

(*a*) The lips, gums, buccal mucous membrane and palate, and appearing as nodules, wart-like growths or ulcers. The nodules and ulceration of the palate are well shown in a specimen sent to me for examination under suspicion of being the result of severe Foot-and-mouth Disease.

(*b*) The upper and lower jaw, where it probably originates in carious teeth, and extending and invading the neighbouring cavities and sinuses destroys the tissues with which it comes in contact,

expanding the bones into thin plates or reducing them to the appearance of pumice-stone.

(*c*) The tongue, where we see it most commonly in the form of nodules or wart-like patches under the mucous membrane with a special tendency to ulcerate from the irritation of the teeth. These nodules may extend into the deep muscles, and often collect in rows more or less parallel to the superficial muscular fibres. Complete transverse sections of the tongue double stained readily show this arrangement even to the naked eye (sections exhibited). Induration of the tongue results from secondary interstitial glossitis. I have seen, in one case only, a tumour imbedded in the substance of the tongue about the size of a small tangerine orange and more or less isolated from any surrounding growth.

(*d*) The pharynx, where the polypoid growths may be illustrated by a specimen from a most interesting case kept under observation for some time at the Royal Veterinary College. The animal died suddenly of asphyxia, and at the *post-mortem* a tumour the size of a cricket ball was found occluding the larynx.

Taking next the respiratory system we may meet with the disease in :—

(*a*) The nasal cavities, originating primarily there or resulting from extension of a growth from the lips, or the pharynx, as in the specimen before you.

(*b*) The larynx and trachea, generally in the form of polypoid growths, sessile or pedunculated, which arise primarily or occur secondarily by extension from the tissues in the neighbourhood.

(*c*) The lungs, where the differentiation of the disease is most important, as the neoplasms in the lungs, especially in the early stages, and the nodular growths on the pleura are constantly mistaken for Tuberculosis.

The disease is very rarely found in connection with the nervous system, but probably does not so rarely attack the reproductive system, although, so far as I am aware, only two cases have been described—one by myself and one by Professor McFadyean.

Fifthly, in the skin and subcutaneous tissues we find a favourite seat of this disease, producing the so-called wens or clyers so commonly seen in the fen country. A wen is first recognised as a small tumour the size of a marble or walnut, which increases in size, sometimes with great rapidity, and breaks down and discharges its muco-purulent contents through the inflamed and ulcerated skin ; or it may go on increasing and form a large, compact growth the size of a child's head. These growths when excised, hardened and cut, have a characteristic honeycombed appearance, produced by the interlacing bands of fibrous tissue which form a spongy

structure, from the interstices of which the fungus tufts and thick yellowish pus have for the most part dropped out. These appearances are seen in the morbid specimens and in complete sections of the tumours.

Prevalence in Australia.

In a report to the Legislative Assembly of New South Wales, Mr. Willous, Government Veterinarian, gave an account of an investigation made in conjunction with Mr. Park into the nature of a prevailing disease of the cattle in Tasmania. The disease occurred principally in the form of tumours of the upper and lower jaw, and from the detailed description I have no doubt whatever that they were cases of Actinomycosis, and wrongly attributed to "scrofulous inflammation." At the Australasian Stock Conference, held in Melbourne in 1889, my report on human and bovine Actinomycosis, published in the Annual Report of the Agricultural Department, 1888, was brought to the notice of the Board by Mr. Buchanan, Mr. Stanley, and Mr. Park, and from the coloured plates and photographs in the Report the nature of the disease known in Australia as Cancer and Lumpy Jaw was at once recognised. Mr. Park moved for an inquiry, and while studying in my laboratory has informed me that this disease is very prevalent, but not yet recognised by the colonial veterinary surgeons as distinct from Tuberculosis. Mr. Park brought over a tumour which he submitted to me for examination and report, and it proved to be an exceptionally interesting case of Actinomycosis, which I have referred to in a communication to the Bacteriological Section (*On the Morphology of Actinomyces*). Dr. MacLaurin, President of the Board of Health, who was also studying in my laboratory, on his return to Sydney, demonstrated by microscopical examination the true nature of the cases mistaken for Tuberculosis. In his report to the Legislative Assembly of New South Wales, June, 1890, Dr. MacLaurin states that the existence of the disease had not been recognised in Australia until he demonstrated the presence of the ray-fungus in a specimen belonging to Mr. Stanley.

Prevalence in the United States.

Reports of the prevalence of Actinomycosis in the United States have reached me through the courtesy of the Board of Live Stock Commissioners for the State of Illinois. In their Report for 1890, several interesting communications have been published. Mr. Casewell, State Veterinarian, investigated an outbreak of the disease, known in America as "Lumpy Jaw," on a farm in Yates City, where there were eighty head of cattle, and sixteen were found to be suffering from Actinomycosis. And writing from Chicago, Illinois, Mr. Casewell reported that the disease was prevalent in nearly every county in that State, and that in his

opinion it was spreading rapidly, and was "dangerously contagious." In December, 1889, Messrs. Casewell, Scott, Williams, and Page reported to the Board that they had examined certain beasts quarantined in the City of Peoria, twelve bullocks in charge of the Northern Distillery Co., thirty-three in charge of the G. W. Distillery Co., and thirty-nine in charge of the Monarch Distillery Co., and all of them were affected with Actinomycosis. In all 109 cases were slaughtered and condemned as unfit for food. Mr. Baker, reporting on four steers and one cow, in the Union Stock Yards in Chicago, found them suffering from Actinomycosis in the form of large tumours in the head, neck, throat, and small tumours, the size of a large pea, in the intestines. The meat was condemned as unfit for food.

As the result of these reports the Board enforces the destruction of all animals affected with Actinomycosis, and prohibits the use of the carcasses of such animals for human consumption.

At a Conference of the Inter-State Live Stock Sanitary Association, the following resolution was carried: "That it is the sense of this Conference that animals affected with this disease should be destroyed, and that the carcasses thereof should not be used for human food."

The Disease in Man.

As in cattle, so also in man, cases of Actinomycosis have been met with, but not recognised as such. By the researches of Israel and Ponfick in Germany, and the recognition of a case in man by Acland in this country, a new field of inquiry was opened up. It was not a new disease in man, but it had not been differentiated from the diseases which it simulates.

The evidence on this point is absolutely conclusive, and it affords a striking example of the value of accurate drawings for illustrating researches on pathological subjects. In 1848, M. Louis met with a pulmonary affection supposed to be cancerous. M. Lebert discovered in the pus, and though unable to explain them, figured the tufts of club-shaped elements with which we are now so familiar. Nearly 200 cases have since been described in the human subject, and about 5 per cent. have occurred in this country.

Points for Discussion.

I would direct your attention to the following points as especially worthy of discussion. I referred to the manifestations of the disease liable to be attributed to Tuberculosis, and would again draw attention to the morbid specimens and photographs. To what extent is this an explanation of the reports of a very high percentage of cases of Tuberculosis in cattle, both in this country and the colonies?

With regard to the disease being dangerously contagious, I am

of opinion that the disease is very rarely, if ever, the result of direct infection from cow to cow, or from cow to man. Two cases have been recorded in support of the theory of infection of man from the cow. Stelzner described a case in a man who had the care of animals, some of them having suppurating glands, and Hacker met with the disease in the tongue in a man who had charge of cows, one of them having had a tumour of the jaw. On the other hand, Moosbrugger found that out of seventy-five cases, fifty-four were in men, and twenty-one in women and children. In eleven the occupation was not stated, in thirty-three their occupation did not bring them into contact with cattle. They were, for example, millers, glaziers, tailors, shop people and students; ten cases occurred among farmers, peasants and farm labourers, and in one case only was there contact with diseased animals. Out of the twenty-one women and children, only four were peasants, and none had been in contact with diseased cattle.

I have so far found no evidence in this country to support the theory of direct infection from the cow, but I have succeeded in transplanting the disease from man to a calf.

There is reason for supposing that man and animals derive the disease from a source in common, and there is a strong suspicion attached to cereals. In my opinion the Royal Commission now investigating Tuberculosis, should include the subject of Actinomycosis, with special reference to the question of the possible transmission of the disease to man, and the action to be taken with regard to the flesh of the diseased animals, and I trust that evidence will be forthcoming on these points from the members attending the meeting of this section.

VETERINARY NOTES FROM PRACTICE.

BY J. A. MEREDITH, A.V.D., 14TH HUSSARS, LEEDS.

DURING the time I was stationed at Mhow, Central India, I was often consulted about cases belonging to the Central India Horse Regiment, then at Saugur, C.I. Some of these were so interesting that I am induced to send the following short notes I took at the time of a

PECULIAR FISTULA.

Subject: A bay Persian entire, aged seven, the property of a sowar of the C.I.H., was marched from Saugur to Mhow, some sixty miles, to the hospital under my charge for treatment. Upon examination on the 12th June, 1889, I found he was suffering from a Fistula on the near side, one inch in front of point of elium and three inches below the extremity of transverse process of fifth lumbar vertebra. I was informed it was first noticed

some seven months previously, and had been treated by the regimental farrier-major.

No discharge from the wound was observed, but simultaneous pressure on both sides of the sinus caused a few drops of serum to exude. On introducing a probe, it entered in a direction exactly perpendicular to the surface of the integument to a depth of five inches. Examination per rectum revealed no apparent cause for the existence of the passage. Apparently no pain was felt, even when the wound was searched with a moderate degree of violence. Pieces of lint introduced on the eye-point of a probe, detached and brought to view small fragments of muscular tissue. Six ounces Sol. Potass. Permang. dil. having been injected and the syringe withdrawn, no ordinary movement caused it to be ejected, but on suddenly lifting the hind-leg the whole was forcibly expelled, bringing with it a small quantity of healthy-looking pus.

June 13*th.*—Injected Liq. Plumb. Subac. et Zinc Sulph. dil. This for several hours caused a slight discharge of purulent matter from the orifice. The lesion, whatever the extent of the original injury, does not affect the general constitution of the animal in the slightest degree. I was informed the horse was purchased as a remount at Bombay with this wound, so no doubt it was of longer standing than reported.

June 14*th.*—Slight diminution in quantity of discharge.

June 15*th.*—Substituted Liq. Pot. Permang. for Liq. Plumbi. Subacetatis; internal capacity of sinus apparently less. No change in nature of discharge.

June 20*th.*—Treatment has been continued; no apparent tendency to heal.

June 30*th.*—Much the same.

July 19*th.*—Not satisfactory. Free incision in path of sinus, fragments of broken-down muscular tissue dislodged by injection. Treatment was continued up to August 19th, when incision had to be repeated. Endeavours were made to have a depending orifice, and measures were taken to heal the Fistula from the bottom, which took a long time. Afterwards the horse was returned for duty, and I heard he performed this in a satisfactory manner. Whilst I was examining the wound per rectum, I inserted a probe in the Fistula, and could easily detect that there was only the wall of the rectum and the parietal peritoneum between my index finger and the point of the probe. This fact naturally made me most anxious to avoid an opening into the abdominal cavity.

Note.—I am quite unable to suggest how this Fistula was caused, unless it arose from a nail on board ship, many of which are used in "rigging" up temporary stalls.

Scirrhous Cord in a Camel.

June 1, 1890.—Subject: A well developed camel about ten years old, in excellent condition, belonging to a sowar of the 1st Regt. Central India Horse. Had been castrated by the actual cautery two months previously to being brought into hospital for treatment. Examination showed a hard Tumour on the off-cord, with adjacent parts inflamed; a sinus existed in the centre of the Tumour.

Treatment: Removal of Tumour. The patient was made to sit down, we then had the fore and hind legs secured by fastening to neck and loins respectively, and taking the precaution to bind the mouth to prevent biting; he was then placed on his side. The Tumour of the cord was then removed, after a little difficulty, by torsion; it weighed 11½ lbs. Antiseptic dressing on pads of tow was applied; to prevent flies gaining access to the wound I inserted sutures, and made a cover for the incision. He was then allowed to get up. With daily attention and cleanliness, he was discharged cured on June 18th, 1890.

Cancer in the Horse.

Through the kindness of Professors Smith and McFadyean, to both of whom the specimen was submitted for microscopical examination, I am able to furnish a few notes upon a case of true Cancer in the horse; and knowing how very rare such cases are in our patients, I am induced to record the same.

I was at a loss to know the exact cause of the complaint in the first instance, having treated it as an ordinary case of Laryngitis.

Subject: Black gelding, aged 12 years, E. 34, 14th (King's) Hussars, on detachment duty at Hampton Court Palace, January 2, 1891.

Laryngitis.—Symptoms: Animal was observed to be off his feed, head protruded, dull, slightly distressed in breathing. Pulse and temperature about normal, discharge slight and of a pale colour from nostrils. Loose box. Stimulated throat with mustard plaster, and ordered Pot. Nit in drinking water, which he took fairly well. Clothed body and bandaged legs.

Jan. 3rd and 4th.—Much the same, eating a little mash—reapply mustard to throat.

Jan. 7th.—No better. Strong blistering ointment applied. Steamed hay inhalations and general nursing.

Jan. 13th.—Treatment same.

Jan. 16th.—No so well; getting very distressed in breathing, and has extensive discharge from both nostrils.

Jan. 17th.—Has still great difficulty in breathing; tracheotomy performed, and treatment as usual.

Jan. 19th.—Seems somewhat relieved; give Cupri Sulph. 3j. et

Canthar. Pulv. gs. x. daily in mash, which food he partakes freely of.

Jan. 25th to 31st.—Continue treatment; appears to be progressing favourably and is less distressed.

Feb. 4th.—Not so well. Stout given daily with Pulv. Gentian. General nursing.

Feb. 7th.—Temperature 101·2; eating mashes and carrots freely, but unable to breathe through larynx when tube was removed. Consider he has paralysis or some obstruction of the larynx; discharge continuous from nostrils.

Feb. 16th.—Able to respire a little through larynx, taking a little corn, discharge not so free.

Feb. 21st.—Tube removed for a short time during the daytime; protruding neck and head, deglutition difficult, discharge free. Consider the case hopeless, and intend asking for a Board to report upon the patient.

Feb. 26th.—Sanction obtained for the destruction of the horse. Discharged destroyed.

Post-mortem.—Pharyngeal epithelioma, the roots extending into the right nasal fossa, but the neck of the polypus obliterates the opening of both nasal cavities. The weight of the Tumour was 18 ozs., and the pressure upon the larynx accounted for all the symptoms. The case was a hopeless one from the first; but it is extraordinary that the horse performed regular duty up to the date of admission into hospital, although the Tumour appeared to be suddenly developed.

ANTIFEBRINE.

BY F. B. VANDERPLANK, M.R.C.V.S., MARITZBURG, SOUTH AFRICA.

In the July number of the Veterinary Journal, I notice that Mr. Nunn gives his experience of antifebrine, and refers to the beneficial results obtained through using it in the febrile diseases affecting the horses of India and South Africa.

My own experience in Natal is, that we have in antifebrine the most important addition to the Pharmacopœia since the introduction of quinine, and that to either man or beast subjected to the vagaries of a tropical African climate, it will be found a useful adjunct to, or an equally useful substitute for, that drug.

Over fifty per cent. of our imported cattle die of Red-water and "Hæmaturia Epizootica"—a disease which shows unmistakable signs of being akin to Texas Fever—the majority of deaths occurring between the second and sixth week after landing. In the incubative stages, the thermometer shows a gradual rise of temperature to 105° or 106° F., and it is then that the owner first notices the animal to be affected. To the stock committed to my charge, I have been in the habit of administering regular doses of

antifebrine, and adding permanganate of potash to the drinking water. So far I have had to record no deaths, and only one case was attended with serious results—that of a young bull, which received three drachms in three hours, when delirium followed, lasting for about an hour. This animal was severely attacked with Red-water, and in its case—as well as all the other severe cases—as a sequel, the skin becomes the seat of enormous clusters of warts. I am expecting seven Frieslands out from Holland shortly, and, for purposes of experiment, only three of these will be treated as above.

In Canine Distemper and Horse-Sickness, too, its uses have been followed with more or less gratifying results. If I am not trespassing on space, a case of the latter may be of interest.

In April last I was summoned to attend a big entire horse. On my arrival at nine a.m. he evidently was on the point of dying; but, at the owner's request, attempts were made to save him. Examination of the chest revealed only a minute portion of the right lung unaffected. At six p.m. none could be detected. The swollen head and gulping prevented medicine being administered by the mouth, so that subcutaneous injections were substituted, antifebrine being the principal agent. No breathing could be detected at all, and clothing of the body was always followed by great distress. The animal lived till two o'clock the next morning; and when opened later every part of the lung was putrid. The question has occurred to me, How did this animal exist at all with no lungs? Did the cutaneous respiration suffice, or did destruction of the lung tissues go on *post-mortem?*

INFLUENZA IN NORTH AMERICA.

BY J. H. FRINK, V.S., GOVERNMENT QUARANTINE INSPECTOR, ST. JOHN, NEW BRUNSWICK.

HAVING read with much pleasure an article in the VETERINARY JOURNAL of July, on "Influenza," by Principal Williams, F.R.S.E., Edinburgh, my attention was attracted by a paragraph on p. 75, as follows:—"One remarkable circumstance in connection with this outbreak, and which, if correct, disposes of the 'contagion only' theory of its origin, is related by Mr. Greene, M.R.C.V.S., of St. John, N.B. He says, 'I was always under the impression that the Influenza was both contagious and infectious till the late outbreak; since then I have altered my views with regard to the contagious and infectious nature of the disease. One among several facts which I could mention, will bear me out on this question. During the month of July, 1872, a horse had been put to grass on Partridge Island, in the Bay of Fundy. This island is

three miles distant from this city. No other horse had been near the island from the date of his landing up to the time of the outbreak in St. John, N.B., and on the 15th or 16th of October, which was only two or three days after the first case was reported in this city, the horse on the island was affected with the most virulent form.'"

The object of this communication is not to question the reliability of Mr. Greene's testimony, nor to assert that his opinion is erroneous, but to place the matter in another light, which may dispel to some extent the weight of the above statement, in regard to the contagion or infection of Influenza. While it is quite true that Partridge Island is three miles from the city proper, it is not three miles from the mainland, nor that distance from where horses are kept. The neck of land known as Negro Town point is not one-fourth of a mile from Partridge Island, and less than that at low tide. I have an opinion as to how the disease gained a footing on that island, which at least is plausible. All, or nearly all, the epizootic disease which has frequented this locality among horses, has been directly from importations of horses from the United States, and one outbreak of Influenza directly from London. The means of transportation in those days were altogether by steamer, and now the same means are largely employed. These steamers, and all vessels coming from the United States, are of a light draft, and pass by the island in the channel; and it would not be difficult to throw a stone from the deck of the steamer on to the island—in the west channel, the route these American steamers take. It is quite possible, nay, altogether probable, that these steamers, preparing for dock, undergo a general cleaning up, and that hay, horse-troughs, straw litter, and various excreta were carried on to the shore, either by the current, which is always swift, or swept ashore by the wash of the steamer, and thus conveyed the contagion; for it must be remembered that herbage is scant on the island, and, with the exception of a few spots, its surface is bold and rocky. During a practice extending over twelve years here, I have had facilities to watch the origin of epizootic disease among horses, and the result of my observation has been that they are directly traceable to importations of horses from the United States, and in one case from Great Britain. I trust you will deal leniently with me for trespassing on your space to such an extent; but the statement of Mr. Greene, M.R.C.V.S. (a gentleman who I have reason to believe possessed marked ability), appears to be a stumbling-block in the eye of Principal Williams, and no doubt others. I think, on close examination (with the explanation given above), there will be found an opening of which Mr. Greene was not cognizant.

Editorial.

CONTAGIOUS PLEURO-PNEUMONIA AND INFECTIOUS BRONCHO-PNEUMONIA OF BOVINES.

It is now some years since a diversity of opinion occurred with regard to the presence of Contagious Pleuro-pneumonia in a cargo of American cattle disembarked at Liverpool, and which were condemned because one of them was found to be affected—according to the Government authorities—with that disease; but which, in the opinion of Professor Williams—after inspection of the lung lesions—was not that malady, but another. Quite recently, a similar case occurred among another cargo of American cattle, and the same veterinary authorities stood in the same position with regard to its nature—this time Professor Williams being supported by the United States Veterinary Inspector, who has been sent to this country by his Government, to see that the cattle imported from the States are not unfairly condemned. This course was deemed necessary from the fact, that many cargoes arriving from that country have been accused of being infected with the Lung-plague, which the veterinarians on the other side of the Atlantic have declared it could not be. The recent case just referred to has caused a more than usual amount of interest, from the striking difference in opinion as to the nature of the changes in the lungs of the diseased animal—in fact, as to whether these alterations were those of Lung-plague or another affection. Not long ago we were shown photo-micrographs of *Pleuro-pneumonia Contagiosa*, and this American cattle disease—which Williams has designated *Broncho-pneumonia Catarrhalis*, and certainly the difference in appearance between the two is very marked.

This divergency in opinion as to the nature of the malady for which shiploads of American cattle have been condemned, has had no result other than that the opinion of the English Government experts has prevailed; and nothing further has been done to settle the matter, though astonishment may be expressed that experimental proof—so easily obtained—was not resorted to.

Strange to say, corroborative evidence in favour of Williams' contention has sprung up in a very unexpected quarter, and on the statement of one of the foremost veterinary pathologists in Europe, who probably knew nothing of what was taking place in England in reference to this matter.

At the meeting of the Central Veterinary Society of Paris, on July 23rd, Professor Nocard, of the Alfort Veterinary School, brought forward the subject of "An infectious Broncho-pneumonia in American cattle"; and to this subject—seeing its great importance—we will devote some attention. It appears, from Nocard's statements, that during last winter, at La Villette—the Parisian cattle-market—several

thousands of fine American cattle from the United States—chiefly from Virginia, Indiana, and Illinois—were exposed for sale; and on three different occasions, the sanitary officers of the market observed that some of these animals were affected with an unusual disease of the respiratory organs. These officers—Redon, Godbille, and Blier—are well-known veterinary surgeons, and it was in their name, as well as his own, that Nocard addressed the meeting. In November last, in a lot of more than 400 cattle direct from Illinois and Indiana, one died and two were very ill, the symptoms leading to the suspicion that they were affected with Contagious Pleuro-pneumonia. The two ailing animals were at once killed, and an examination of their lungs was made by Godbille. There was no Pleurisy, but the interlobular septa of hepatised portions was the seat of a very abundant serous infiltration. Before arriving at any decision as to the nature of the malady, and in view of the serious importance of the case—from the number and value of the animals—the two sets of lungs were sent to Alfort to be submitted to Nocard. He reports that, at the first glance, a section of the hepatised tissue presented the appearance of a recent lesion of Contagious Pleuro-pneumonia. The tissue was dense, compact, friable, and the colour varied from bright red and deep brown to almost black; while the lobules were isolated from one another by thick septa, infiltrated with a considerable quantity of yellow, limpid serosity. But a closer examination showed that there were notable differences between these lesions and those of Lung-plague. The connective-tissue infiltration was less abundant, and the serum less albuminous, and not so yellow or limpid; and here and there pressure on the excessively distended lymphatic sacs extruded small, white, smooth and firm fibrinous concretions. The tissue of the lobule in the greatly thickened girdle of connective-tissue, had not the uniformity of tint and consistence that characterise the Pleuro-pneumonic lesion; it was harder, more manifestly hepatised in its centre than at its periphery—*the lesion proceeded from the bronchule, and not from the perilobular tissue.* In Pleuro-pneumonia it is the opposite; for in it, when the lesion is very recent, lobules are often found, the tissue of which is dense and dark at the periphery, while in the centre it is yet rosy, elastic, and permeable. There was another important differential sign: pressure caused a notable quantity of thick, viscid, light-yellow pus—analogous to that observed in certain forms of verminous Broncho-pneumonia—to issue from the bronchules, but a microscopical examination of this fluid, and of the lung-pulp, did not lead to the detection of ova, embryos, or worms of any kind. The bronchial mucous membrane was inflamed, thickened, and corrugated, and more or less denuded of its epithelium; while the submucous connective-tissue was infiltrated with yellow serum, and considerably thickened in places.

This muco-pus from the bronchules was found to contain an abundance of short, oval, motile bacteria, which appeared to be the only microbes present. The organisms were also found, as if in a state of pure culture, in the hepatised tissue, and more especially in the limpid serosity that distended the perilobular lymphatic sacs. This single

character alone sufficed to affirm that the lesion was not of a Pleuro-pneumonic kind ; for it is well known that the lung serum in that disease is very poor in figured elements, and that when it is collected pure from the infiltrated septa it does not usually contain any microbes.

In this instance, the microbe which existed in such numbers in the pulmonary lesions belonged to the large class of ovoïd bacteria, of which the rounded poles fix anilinated colouring matters more strongly than the centre.

Nocard points out that Fowl-cholera, Duck-cholera, the Septicæmia of rabbits and the ferret, the Game-plague (the *wild-seuche* of the Germans), the *barbone* of the buffalo, Pneumo-enteritis of the pig, etc., all have analogous microbes, which can only be distinguished from each other by their collective biological characters, and more especially by the effects of their inoculation on different kinds of animals.

After describing this microbe in detail, and its cultivation, Nocard refers to the results of inoculation with it. These results were always the same—muco-pus in the bronchia, and serosity in the pulmonary connective-tissue septa, whether the cultures were old or new. Mice, rabbits, guinea-pigs, and pigeons, when inoculated subcutaneously with two or three drops of the serum or the culture, succumbed in less than forty-eight hours, without œdema at the point of inoculation, with intense congestion of all the viscera, but without any definite localisation. The blood examined soon after death did not show many bacteria, but they increased the longer the interval that elapsed, and especially if the pipettes containing the pure blood were left on the stove for a few hours. When the fluid was injected into the peritoneum, death resulted in fifteen to eighteen hours, with a purulent peritonitis of great intensity ; the pus was very abundant, viscid, and not fibrinous, and contained an enormous quantity of bacteria.

Sheep and calves, inoculated subcutaneously or in the trachea, with a cubic centimetre of culture, of serosity, or of virulent pus, did not die ; they suffered, however, from intense fever, and remained prostrate, without appetite, for some days, but soon regained their normal condition.

Intra-pulmonary inoculation was more effective ; as a calf of eight months and a ram of two years, inoculated in the right lung with five drops of peritoneal pus from a guinea-pig, died in less than forty-eight hours with fibrinous Pleurisy and exudative Broncho-pneumonia analogous to that observed at the autopsy of the American cattle ; the lesions were extremely rich in bacteria.

A curious fact was elicited in these interesting experiments. A calf and two sheep, previously inoculated subcutaneously, then in the trachea, afterwards resisted the effects of intra-pulmonary inoculation with ten drops of virulent culture ; their temperature remained for three days above 40°.5 Cent., there was great sensibility of the thoracic parietes, and dulness in the inferior two-thirds of the inoculated lung ; but all the morbid symptoms disappeared promptly, and subsequently they have undergone two other intra-pulmonary inoculations of serum and culture fluid, without any apparent trouble. It would, therefore,

seem that, though subcutaneous inoculations will not kill large animals, it will confer such a degree of immunity as will enable them to resist a pulmonary—and otherwise fatal—inoculation. The pig, fowl, dog, and rat resisted all modes of inoculation.

Nocard arrives at the conclusion that the disease does not resemble any known in France, and he considers it probable that it is a malady special to American cattle; and that it is not rare is proved by the fact, that since the month of November he has seen it—always presenting the same features—in other lots of cattle from the United States—Indiana or Illinois. He is inclined to think that it is the affection which is known in the Western States as the "Corn-stalk disease"; but however this may be, it results from his observations and investigations that American cattle are liable to a microbic Broncho-pneumonia, hitherto unknown in France; and the serious question therefore arose, as to whether there was any danger to be apprehended from the importation of such animals—a question put to Nocard by the French agricultural administration. From his attentive observation of facts, and the experimental study of the conditions of contagion, he concluded that the malady had only very feeble contagious properties. In the three very large importations in which the disease was detected, notwithstanding the considerable number of animals in each, and their long and close contact with each other, the affection did not spread, and the cases remained isolated ones. From all these facts, his opinion was there was no urgent danger or any necessity for special measures.

The question that now arises on this side of the Channel is one of some moment, not only from an economical, but also from a pathological point of view. Many cargoes of American cattle have been condemned, because it was found that one or two in each lot were affected with what was supposed to be the specific, and only too well-known Lung-plague. United States veterinary surgeons have strenuously denied the existence of that malady among the cattle, and Professor Williams, on two occasions when the matter has been referred to him, has concluded that Lung-plague was not present, but that the lesions were those of Catarrhal Broncho-pneumonia; and now Nocard finds what we are almost forced to conclude is the same disorder, examines it and experiments with it as a scientist of his position and responsibility should do, and—*mirabile dictu*—arrives at the same conclusion as Williams, and even designates it by the same name. It will be an extraordinary revelation if what has been considered as Contagious Pleuro-pneumonia in American cattle, should turn out to be something very different, and of little, if any, importance. The slaughter mania is a terrible barrier to pathological observation; and little as we have done in this country in the way of scientific investigation of animal diseases, it is to be hoped that the example of France in this instance will not be without effect. It is quite possible that the American cattle found in La Villette market would have been condemned here as infected with Contagious Pleuro-pneumonia, and the usual consequences would inevitably follow. Must we again say that in this instance, as in so many others, "they manage these affairs better in France"?

THE GENERAL PATHOLOGY OF "SURRA" IN ANIMALS.

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THE contributions to the literature of *Surra* in the pages of our journals are at once instructive and suggestive. Coming from the pens of experts, from those who have had much personal acquaintance with the disease and those who have studied its natural history and pathology, they form a valuable collection of opinions which serve to illustrate the difficulties of inquiry and the obscurity that still dominates the subject. The need for investigation is clearly shown, but the complexity of the questions to be investigated is manifestly great. Many of the writers furnish lists of propositions regarding the classification of the parasite; some indeed limiting themselves to these, whilst others deal more generally with the subject. It could hardly be expected that anything like unanimity of view should prevail, and without attempting to cover the whole ground, it may be useful if we submit a few suggestions upon most points regarding the disease. In the first place, there is considerable divergence upon the essential nature of Surra. I. V. S. Evans was the first who noted the presence of parasites in this disease, but he did not identify the malady. Mr. Steel stands alone in the belief that it is "a form of relapsing fever in the horse." Most veterinary practitioners who have studied the disease, as well as acknowledged bacteriologists, show that there is nothing in common between the two affections. Indeed, Dr. Vandyke Carter himself cannot see any identity between the parasite of Surra and and the spirillum common to relapsing fever in man. Surgeon-Major Ranking contends that Surra is, in fact, Ague in the horse. Indeed he thinks that at present there is no other deduction from the facts, and thinks he has obtained further evidence in support of the opinion he has formed as to the identity of the plasmodium malariæ and the bacillus malariæ in man. He advances reasons for his belief that the general view of the plasmodium being considered as a protozoon is also incorrect. And he points out facts in support of his arguments that Surra and Ague are equivalent diseases. It is by no means necessary to the truth of his argument that such is the case, as he relied upon the diagnosis of veterinary surgeons that the disease he investigated was Surra, and "the diagnosis was borne out by its fatality." Although we cannot entirely subscribe to Dr. Ranking's opinion that its fatality allies it to Ague, yet he has so well supported our own views with regard to the nature of Surra* and has so thoroughly studied the question of the micro-organisms present in that disease and argued it with such ability as to compel attention to his views, and indeed the whole question of its parasitology in any inquiry that may be made. The observation of parasites in intermittent fever of the horse ("Equine Diseases of India," by R. W. Burke, July, 1887, p. 4), resembling those described by Laveran in the blood of man during the ague paroxysms, receives confirmatory evidence also from the pen of Dr. Carter (*Lancet*, June 16th, 1888) who found that in ninety-three instances of malarious disease in man (Intermittent Fever, Simple Remittent Fever, and splenic cachexia) these organisms were present in nine. I have recently shown (VETERINARY JOURNAL, March, 1890), that similar organisms are present in intermittent and remittent fever of the horse.

Among the parasites found in the blood of the horse the most remarkable is the monad, which is known in India as the Surra parasite, the disease with which the creature is associated being termed *Surra*, or Pernicious Anæmia ("Tropical Diseases of the Horse," 2nd Ed, by R. W. Burke, 1888). Much

* See article on Malarial Fever among Horses in India, by R. W. Burke in the VETERINARY JOURNAL, July, 1890

valuable proof of the influence of the Surra parasite in the production of the disease has been lately advanced. It is quite certain, however, that the same parasite—or, at least, an identical organism so far as form is concerned—is found in the blood of a large proportion of the common sewer rats (Lewis, Crookshank, Carter) and camels (Evans), etc, apparently in perfect health. Very little doubt exists as to the occasional presence in the blood of wandering larval nematode worms. The fluid is not generally considered to be the home of parasites, and the helminthologist rarely thinks of searching for them in the interior of blood-vessels.

Other animals, beside the horse, have been known to suffer from the disease. Megnin (*Ref. Thierarzt*, 1882), describes a symptomatic type of this disease seen in dogs and cats, which was caused by an ankylostome producing Anæmia, and which is, without doubt, a similar disease to the symptomatic form of Anæmia in man. Johne (*Sache Jahresbericht*, 1884) saw this disease in the dog as a secondary affection, following a suppurative form of disease. Imminger (*Wochenschrift f. Thierheilkunde u. Viehzucht*, 1886) has observed enzootic outbreaks of it in cattle, Fröhner* (*Archiv f. Wiss u. Prakt. Thierheilkunde*, Bd. xii, 5 u. 6 Heft, 1886) describes having only recently seen this disease in the horse, and Friedberger (*Lehrbuch der spec. Pathol. u. Therapie der Hausthier*, vol. ii, 1887) also saw an outbreak of it in this animal, in which similar parasites were found. We know how severely animals suffer from the presence in the blood of other minute organisms. The Strongylus Tetracanthus gives rise to epizootic outbreaks of emaciation in horses in many districts of England (Gresswell, "Manual of Equine Medicine," 1885); the Strongylus Contortus has been known to produce a form of Pernicious Anæmia in the horse (*poikilocytose*) observed in Buenos Ayres (Wernicke, *Deutsch. Zeits. f. Thiermed. u. vergl. Pathologie*, 13 *Bd.*, 2 u. 3 Heft, 1887); Texas Fever of cattle has been shown to be due to a paroxysmal destruction of red-corpuscles, caused by an intra-globular parasite which Dr. Theobald Smith thinks may be a phase in the life history of some of the mycetozoa, such as the monadineæ; or it may belong to the group of sporozoa, some of which are pronounced cell parasites (VETERINARY JOURNAL, March, 1890). Whilst not only Anæmia, but liver disease and a form of dysentery are produced by allied parasites in man (Leukhart, Fayrer, Kynsey and others).

One can hardly conceive that these organisms should exist in the blood, in any numbers, without affecting it prejudicially, though we know that they have been found in the blood of animals which were apparently healthy. Of course, it is difficult to define any absolute standard of perfect health, and there may be a considerable amount of Cachexia, even in animals appearing quite healthy. Dr. Paquin has noted that the parasites of Texas Fever are found in the normal liquids and tissues of infectious cattle that always appear healthy, and even in the young before birth. He says,—"The germ of Texas Fever requires a resting period, during which it regains its vigour, and until such time as vigour is regained it lies dormant." (*Journ. Comp. Med. and Vet. Archives*, July, 1890). What the peculiar change in locality or action on the part of the monads may be that determines the diseased condition, is one of the points which needs elucidation. We naturally ask if there be any analogy in the behaviour of other parasites in this respect? Dracunculus may cause little or no trouble in the earlier stages, but developing, changing place, and discharging its embryos, the gravest results follow; Trichina in its earlier stages is comparatively unfelt, but may become the cause of fatal disease. We may, therefore, conclude from these facts that, in order to produce Surra in animals, various conditions—such as affect the patient's system as well as

* *Uber perniciöse Anamie beim Pferde, von* Eugen Fröhner, Berlin, 1886.

influence the parasite in question, are essential; and that in the absence of these conditions, the same parasites may frequently be present in the blood without causing any disease. Similarly, in regard to the relation of Anchylostoma to the Anæmia of man, it has been noticed that this parasite was so frequent in the post-mortem examination of cases that did not die of Anæmia, that it is doubtful as to whether its presence invariably gives rise to Anæmia with all its train of symptoms (*Brit. Med. Journ.*, June 30, 1888).

Dr. Vandyke Carter,* of Bombay, has demonstrated that Malarial Fever in man is of the nature of hæmatozoic affections. He has ascertained that in Remittent Fever of man the blood contains parasites which, in their morphology and general features are identical with the parasites of Surra in the lower animals. Professor Klebs, of Zurich, who has made a thorough examination of the blood of many patients suffering from Influenza, has found in it enormous masses of flagellate monads. These were of two forms: a smaller with very active movements of the flagella, and a larger with much slower movements. In specimens stained with methyl blue, Professor Klebs observed that the monads were sometimes on the edge of the red blood-corpuscles, and sometimes inside them. They are said to resemble the hæmatozoa of Pernicious Anæmia, and the plasmodia found by Leveran in the blood of patients suffering from Malaria. (*Wiener Med. Zeitung*, Feb. 4, 1890.)

I have in the first edition of my work on "Equine Diseases of India," 1887, and elsewhere, shown that similar monads may be found in Intermittent and Remittent Fever of the horse in India. And Dr. Ranking has recently claimed an identity between the organisms of Surra and those found in intermittent fever (Ague) of the human subject (VETERINARY JOURNAL, June, 1891.) Klebs acknowledges that in those cases in which he observed flagellate protozoa in the blood in very large numbers there was a repeated occurrence of febrile states, generally in the form of intermissions (*Centralb. f. Bact. u. Parasit.*, No. 5, vii, 1890.) The existence of protozoa in the blood in malarial or intermittent fever is undoubted, and Dr. Klebs assumes that in those cases in which he noted the presence of monads (*Rhizomastignia* of Butschli) there was a repeated occurrence of febrile states, generally in the form of intermission. (*Brit. Med. Journ.*, Feb. 15, 1890.)

The differences of opinion of various investigators as to the morphology of the parasite witnessed in Surra are clearly accounted for in McCurdy's description of the organism peculiar to Texas Fever, which I believe to be an analogous disease. Mr. McCurdy says—"The germ of this disease may be said to be of the bacillar species and the facultative type, assuming various forms during life. The ovoid forms are the ones particularly noticed, but it appears that this is only a transition stage which finally terminates in the more mature form. If cultures are prepared from material containing the ovoid forms, they elongate, become surrounded by a gelatinous areola, and break off into two short rods or double and single bodies. The spherical ovoid forms and short rods are found both in the liver and fluids in zooglea. At the ends of some germs flagella are noticed, which probably give them the slow, bending, twisting motion that is often seen in many cultures. The more mature forms vary in size from 4 m. to 5 m. in length, and 17 m. in width; the ovoid stage, the length is 25 m. to 30 m., and width about 15 m. They are difficult to stain, but answer most readily to 'Johne's fuchsin.' The cultivation has been tried in many different media, such as blood serum, beef broth, agar-agar, egg albumin, potatoes, and oyster bouillon, but

* On the lately demonstrated Blood Contamination and Infective Disease of the Rat and Equines in India, 1888.
Note on some Aspects and Relations of the Blood Organisms in Ague, 1888.

artificial lymph with liver broth seems to be productive of the best results." —(VETERINARY JOURNAL, June, 1891.)

Speaking of the intra-globular bodies met with in Texas Fever of cattle, Dr. Theobald Smith* says:—"The smallest forms appear like deeply stained cocci, about ½ to 1 *u* in diameter, situated within the unstained circle of the corpuscle. Occasionally the bodies are nearer 2 *u* in diameter, and then the staining may be less dense. Besides the spherical forms, ovoid forms are not uncommon. These usually occur in pairs with the same red corpuscle A still rarer, pear-shaped form is encountered in stained preparations of the blood. It is rounded at one pole, while the other is pointed and sometimes drawn out as a short filament. These forms quite invariably occurred in pairs, a corpuscle being occupied by a single pair. I believe the pair to be a result of division of the single body within the globule. In one instance I saw the tapering ends of a pair apparently continuous. Each body was about 3 *u* long, its greatest width, 1-5 *u*. These are the largest I have encountered." This same form of organism has been noted by Fröhner† in Pernicious Anæmia among horses in Germany, where two, and even three, or four were witnessed in the same corpuscle.

Of chief interest at present stands the subject of the pathology of Surra. The discovery of the parasite might be thought to have advanced the question of its etiology sufficiently in itself without any further questions regarding the disease, but as we have endeavoured to show, there is much to learn about this parasite and its behaviour in the body of the animal. Our means of investigation are generally so limited and imperfect that in any inquiry we must note everything that must lead us to form anything like an accurate notion of the facts presented. Much valuable data has been advanced by the different writers in support of their beliefs; still, all is hypothetical, and the need for extended inquiry into the pathology of Surra was never better shown. In fact, we are not far from the truth in asserting that a wider knowledge of the laws of pathology may be requisite before the problem can be properly approached.

After all, the main problem is, what disease in mankind is Surra allied to in its main points? Has it any identity to any disease of human beings? To what disease does it bear the greatest resemblance? And in what points? So far the answers to these questions have not been faced properly; for although the answer to them would greatly assist our inquiry into the pathology of the disease, yet hitherto it has been found impracticable.

The general name of Ague, Intermittent Fever, or Malaria is given to a disease produced by a common cause;‡ and the same cause is credited with producing other more severe forms of disease called Remittent Fever, Pernicious Anæmia, Malarial Cachexia, etc. It may be a question whether all these forms of Fever are due to the same cause; but the general opinion is that they all constitute the same disease in various degrees of severity. The one feature common to all is Fever which remits and returns periodically. The other symptoms need not be considered here. It will suffice, perhaps, if we take up the characters of Surra first. We shall then be able to arrive at an opinion as to which condition it is allied to in particular. We have alluded to these points in previous articles we have contributed to the VETERINARY JOURNAL

* *Veterinary Journal*, March, 1890.

† *Archiv. f. Wiss. v. Prakt. Thierheilk.*, Bd. xii, 5 *u.* 6 Heft, 1886.

‡ With regard to the nature of the germ, certain researches seemed to identify it with a certain bacillus found in the soil of malarious districts; but more recently an animal organism, a flagellate infusorian, has been found in the blood of ague patients, which seems more probably the cause of the disease. It has been shown by Marchiafava and Celli that the inoculation of the blood of an ague patient into healthy persons will reproduce the disease in them.

and elsewhere. In drawing attention afresh to this disease I shall refer briefly to the most important features which are regarded as peculiar to it.

We may state that the clinical history of Surra in general is that of Pernicious Anæmia. The marked anæmic conditions, observed both *ante* and *post-mortem*, the leucocytosis fatty degeneration of the muscles, liver, spleen and other organs, the general hæmorrhages, and the chronic state of fever, which end in death in so many cases, leave no doubt as to the nature of the disease.

(*a*) *Temperature.*—A point of interest we have noted in the case of Surra in India, and which other veterinary surgeons had done in that of pernicious Anæmia seen in Europe, is the well-worn subject, the paroxysms of increase of temperature, the so-called "Anæmic Fever" of writers on Pernicious Anæmia in the human subject. Zschokke * also has assigned a prominent place to this fever, which he found to be of an intermittent type in the horse; and Fröhner† has likewise noted a marked rise in temperature on the fourth day, which, with slight remissions, remained high till death.

(*b*) *Duration and Course.*—The most important feature of the disease is that there is no history of a definite onset, and that the condition is progressive. There are usually a number of relapses, the average duration of the disease being probably not less than two months. The course is sometimes prolonged to several, usually six to eight weeks; the average duration of the human disease (Pernicious Anæmia) being also estimated at "two months." The average of several cases noted by Dr. Evans was two months. It is seen that weak animals succumb sooner, and in some outbreaks the ordinary duration of the disease does not exceed from one week to a fortnight, and frequently may be less in outbreaks in which reckoning was made after the date of admission on the sick report.

(*c*) *Varieties.*—"There is another variety of Surra, which is never acute from the beginning, or scarcely even sub-acute. It is truly chronic, may last for months, and occasionally intermits during its course. Though such animals may be seen to be frequently on the sick list for debility due to general loss of blood, indicated by anæmia of mucous membranes, a weak and readily excitable pulse, and swelling of the limbs, etc., they cannot be said at any time to suffer from more than chronic Asthenia, and to say the least of it, their appetite remains as good throughout the course of this disease as when they were in perfect health. Such cases occur sporadically, are not very uncommon, and I believe a number of rejections by means of special casting committees to which every battery of artillery and regiment of cavalry is liable in India are due to this disease. In most, if not all of these cases, it is exceeding difficult to make any impression by the use of internal remedies. They are liable to frequent intermittent attacks of debility, in many cases the animals falling away to a mere skeleton. In the treatment of such cases a most essential element is removal from the place where the disease was contracted. In the acute form, as mentioned before, the disease is very fatal, but in the milder and more chronic form recovery is sometimes noted, although the malady being liable to recurrence it is difficult to say whether this really takes place." ("Tropical Diseases of the Horse," second edition, 1888, pages 40-5.) A few cases have been seen by Dr. Evans to make slow progress in the disease for over a year.

(*d*) *Fatality.*—The disease has been characterised as an "invariably fatal" one. There is probably no disease in which the fatality is so high as in Pernicious Anæmia.

(*e*) *Urine.*—The urine in most cases is albuminous, and contains much hæmoglobin, which is set free by the destruction of the red corpuscles.

* *Schweizer-Arch. v. f. Thierheilkunde*, Bd. 25, 1883.
† *Archiv f. Wiss. u. Prakt, Thierheilkunde*, Bd 12 5 *u.* 6 Heft, 1886.

(*f*) *Appetite.*—In spite of a greedy appetite, debility appears progressive, in character. It is scarcely necessary to remark on the importance of this symptom in diagnosis, as all who have written on Surra lay special stress on it. Veterinary-Surgeon Cooper, in his report on an outbreak of Surra among ponies in the Berars, states that "the appetite is seldom quite lost, and sometimes an animal continues to feed up to the very last." And Professor Frohner has also noticed it in the German type of the equine disease.

(*g*) *Paralysis.*—Most veterinary surgeons who have witnessed Surra in animals in India as well as in Burmah, mention both an acute and a chronic form of Paralysis as commonly characterising it. And Fröhner has noted the same feature in Germany, where this symptom of Paralysis was not infrequently present in Pernicious Anæmia of horses.

We have also noticed pronounced stringhalt, muscular tremors, crossing of the legs, etc, develop during the course of Surra, due to effusion on the spinal cord and on individual nerves. And Mr. Thomas Bowhill, F.R.C.V.S., records having witnessed somewhat similar symptoms in Southern or Texas Cattle Fever. (VETERINARY JOURNAL, July, 1890.)

(*h*) *Treatment.*—I attached considerable importance to arsenic in the treatment of cases of Surra, with the view of contrasting or comparing the results with those obtained through the use of this agent in Pernicious Anæmia; and Veterinary-Surgeon Butler* recently reported most interesting results from treatment of cases of this disease in Burmah ponies "with arsenic pushed as far as possible." This observation is worth noting, when we remember that arsenic is the only remedy of any value in cases of Pernicious Anæmia in the human subject. In a recent paper by Professor Osler, in the *Therapeutic Gazette* of the same year, he states that in all cases of pernicious or essential Anæmia there was no case of recovery in which arsenic did not form the basis of treatment. I have found that hypodermic injections of quinine have a powerful effect in reducing temperature during the paroxysms. "I know of nothing that has an antipyretic power as the sulphate of quinine, for it decreases the temperature, retards tisssue change, and prevents or modifies periodicity." ("Tropical Diseases of the Horse," second edition, 1888, pages 49-50) And we are supported in this opinion by Dr. Ranking, who says: "Quinine on full doses appears to control the disease, supplemented by general measures to combat the Anæmia and weakness consequent on prolonged illness, chiefly by milk, iron, and arsenic." (VETERINARY JOURNAL, June, 1891.) There is little doubt that if the disease is treated early by quinine, arsenic, iron, and perhaps others tonics, by changing the water and making some variation in the location of the animals, great benefit, if not absolute removal of the disease, may be secured. To obtain the most satisfactory results, it should be treated early, before marked tissue changes have taken place. If the treatment be adopted at a later period, it may still be beneficial, though less so than in the early stage.

(*i*) *Prevention.*—Prevention is better than cure. Hence climate and soils favourable to the growth of malarial organism should always be avoided. According to Parkes the following soils are most so, viz., alluvial soils, old estuaries, deltas, sands, clay, chalk, granitic or trap rocks, and particularly vegetable soils at the foot of hills—as the jungle, or terai, in India.

We have noted that change of locality and climate is most favourable to recovery in these cases. The influence of high annual temperature in producing more pernicious forms of Malaria is illustrated in the case of Surra, and suggests the removal of all animals suspected of infection to those stations which are known to possess a milder climate in India (and, perhaps, better still, to the hills), which are less suitable to the growth of Surra organisms. And lastly, preventive inoculation with Surra parasites artificially weakened,

* *Quart. Journ. Veterinary Science in India*, 1888.

is a most important means of acquiring permanent immunity from the disease, and should be specially practised.

(*j*) *Influence of Season.*—It has been seen that Surra occurs most commonly after the rainy season in India. There may be many local conditions—susceptibility to climate, season, etc., that may affect the greater prevalence of the disease in animals, in different outbreaks. Dr. Moore, at a recent meeting of the Royal Academy of Medicine, Ireland, pointed out that season exercised a great influence on the occurrence of Pernicious Anæmia also in the human subject.

(*k*) *Post-mortem Appearances.*—Dr. Evans, our first authority on Surra, writes: "I am prepared to state positively that this disease is not characterized by any structural organic change; it is purely a disease of the blood." Principal Veterinary Surgeon Oliphant says:—"In one outbreak of Surra in the 18th Bengal Cavalry, in which 180 horses died, I made dozens of post-mortem examinations, and the appearances in all were identical; extreme pallidity of the tissues, with perhaps a trifling serous effusion into the abdomen, etc. In fact, the animals looked as if they had been starved to death." Veterinary Surgeon Cooper says, "that the most striking feature is the anæmic condition of the tissues generally, and the absence of recognisable lesion." And Zschokke* also states "that none of the principal organs show any marked structural change" in the equine type of Pernicious Anæmia noticed in Germany.

Mr. Steel lays stress on the presence of gastric ulcers, which he believes to be "characteristic of Surra," and the relation of gastric ulceration to Pernicious Anæmia formed the subject of discussion lately at the Royal Academy of Medicine of Ireland. (*Lancet*, March 10, 1888, page 474.)

The pathological changes that take place in the various organs and tissues of the body as a result of Surra may be characterised, in a word, as degeneration due to imperfect nourishment. The blood itself is rendered unfitted for the purposes of proper nutrition, and degenerative changes of an adipose character, sometimes leading to disintegration of portions of the imperfectly nourished tissue, take place. When organs and parts so weakened by starvation are distended with anæmic blood which they cannot utilise, sloughs result from gangrene of the imperfectly nourished tissues, as evidenced in the ulcerations of the stomach, etc., noted in this disease. The ulcer itself, once formed, suffers from nutritional defect, owing to the impoverished state of the blood which prevents the formation of resisting tissue around it, and often leads to perforations. The alimentary mucous membrane in general will be found to be in an anæmic condition, with Petechiæ and ulcerated spots the result of disintegration and atrophy. Although the tissues present a blanched appearance, there is a large deposit of fat all over the body, but especially noticeable under the skin. This gives to the tissues a peculiar jaundiced appearance, which is shown to be due to deposition of fat globules seen under the microscope. It is easy to understand how a process of abstraction of blood, a fluid rich in oxygen, by the parasites, would lead to the conversion of albuminoid tissue into fat. The lymphatic glands throughout the body are more or less swollen and œdematous. There is often acute dropsy with no other post mortem lesion save extreme anæmia and yellow-staining of the tissues due to fatty degeneration. The heart was found to be the seat of marked fatty changes in cases seen by Mr. Steel, and this is corroborated by the observations of Frohner* and other Continental writers. As the lymphatic glands supply lymph corpuscles to the blood, this may account for the excessive production of leucocytes, although how and in what way this extraordinary accumulation of leucocoytes in the blood is produced in Surra has not yet been clearly explained.

* *Schweizer Archiv. fur Thierheilkunde*, Bd., 25, 1883.

The early symptoms of Hepatitis present in Surra, which is shown by Jaundice of the visible mucous membranes, may be due to congestion of the liver caused by irritation of the worms in the biliary capillaries, leading to their rupture, and consequent deposits in the gland-substance. There is every reason to believe that when the liver has become so invaded, it is incapable not only of duly performing its own function of secreting bile which is essential to proper digestion and health, but that it is an abiding pathological source of general Jaundice, which, if not removed, may result in the gravest evils—blood disorganisation, general Anæmia, Anasarca, etc.

In those cases in which paralysis of the hinder quarters or other nervous symptoms are well marked, the grey matter of the cord generally shows blood extravasations and staining of the nerve-cells; but beyond a tendency to congestion and occasional blood extravasation, no lesions are usually discovered in the nervous system.

I think that we may safely formulate a definition of this disease with the aid of the foregoing observations. It is essentially a blood disease allied to, if not identical with, that disease of mankind known as Pernicious Anæmia. It assumes an acute and a chronic form, but more frequently the latter in the equine species in India, and is known under a variety of names—Intermittent and Remittent Fever, Malaria, Malarial Cachexia, Pernicious Anæmia, etc.—depending on the stage of development and other features. That an acute form of Surra occurs in horses was noted by many observers, and we have already pointed out in the "Tropical Diseases of the Horse," 1888, p. 41, and elsewhere, that this was in fact Intermittent and Remittent Fever of the horse, which is better known perhaps under the common name of Ague, Malaria, etc. And Dr. Ranking has recently corroborated our views, and states that in those cases of Surra among horses in which he noted the presence of parasites, there was a decided likeness to Malarial Fever of mankind.

The problem of the connection between the *plasmodium malariæ* and the *bacillus malariæ* still awaits solution. How fruitful such a line of investigation may be, has been conclusively proved by the discoveries of Klebs, Tommasi-Crudeli, and other writers.

But these inquiries must stand over at present, and we urgently want a practitioner of experience to stir up the fainting energies of our young veterinarians in India. That such a stimulus is greatly needed is clear from the literature of the disease and its present condition. We want readable dissertations on its clinical characteristics, general pathology or treatment and prevention, of value to the general practitioner. It is, I think, full time that we made some decided effort to save from extinction what was known of the disease in the past and which, under careful record, might take an important part in the scientific studies of the subject of Surra in India.

Conclusions.

1. That Surra is Malarial Fever among horses, and has a mild and a severe form.
2. It appears most frequently in the pernicious form in India. The influence of high annual temperature in producing more pernicious forms of Malaria is well known.
3. In the mild, as well as in the severe form, treatment, unless early carried out, proves of little avail.
4. Preventive measures, and particularly protective inoculation, should be adopted in preference for animals.
5. We know that the disease is taken into the body by the mouth or by inoculation, and that it is not infectious. (Evans).

6. That it is given out of the body by the excretions, but particularly by the fæces and urine. Hence grounds exposed to affected animals should not be used for grass-cutting in India.

7. Water is a primary source of the disease, as it harbours more than two-thirds of the parasites common in our animals, and should therefore be boiled to destroy the Surra organisms that are present in various stages of development and which possess great resisting power.

8. Climate and soils favourable to the growth of malarial organisms should always be avoided.

A SUPPOSED NEW DISEASE AMONG CATTLE IN THE UNITED STATES OF AMERICA.

ALARMING rumours of a new disease—supposed by some of the reporters to be "Foot-and-mouth Disease"—have been current for some weeks in the United States, and to allay the alarm the State Board of Live-Stock Commissioners has issued a bulletin on this supposed new disease affecting cattle. The disease appeared among cattle in 1890 and again within the past two weeks. It causes loss of flesh and milk and some fatalities. The Board has caused an investigation to be made by Dr. John Caswell, State Veterinarian, and Prof. A. H. Parker, of the Chicago Veterinary Commission. The report of the veterinarians embraced in the bulletin is as follows:—

Symptoms.—The disease manifests itself by the following symptoms: Swelling of the muzzle, soreness of the mouth and feet, drying up of the milk in cows, loss of appetite or inability to eat, loss of cud, rapid loss of flesh, soreness of the tongue 2 in. or 3 in. up from the point and sometimes protruding from the mouth, soreness of the gums and nostrils, more or less discharge of the mucus from the nose, which coagulates and accumulates, partially closing the openings. The soreness of the feet and legs seems to be in the skin, which is swollen from the hoofs upward, in bad cases nearly to the body, and cracks in transverse fissures at the fronts of hocks and backs of knees, and the animals are inclined to lie down most of the time, or are disinclined to move. At the time of the swelling of the muzzle there appear little red dots, which spread and run together, forming brown patches, and in this stage desquamation (skin peeling off) takes place, leaving raw surfaces, which heal slowly.

The following evidences of disease are seen on *post-mortem* examination:—Extensive irritation of the lining of the stomach and bowels, and, in bad cases, considerable inflammation. The contents of the stomach and bowels are soft from excessive secretion of mucus, which accounts for the Diarrhœa seen in many of the more serious cases. The other internal organs present no evidences of disease.

Probable Cause.—From what observations we have made it seems to us that this disease is not contagious, but due entirely to some acrid substance which forms on or within some plant which is taken in with the food, for only those parts of the body which come in contact with the food either before or after it is eaten are affected.

Treatment Advised.—The following treatment, which is very simple, seems to have a very beneficial effect, even severe cases recovering rapidly:—Linseed oil (raw) in pint doses, three times a day, until the bowels move freely, and for a local application, a solution of borax as strong as water will dissolve it, three times a day applied to the mouth and nose with a sponge. The animals under treatment should be kept under cover and fed on sloppy food.

The bulletin then says:—"The above is published in order that owners of

cattle affected may avail themselves of the information obtained by the investigations had, and be able to promptly apply the remedy. Prompt action on the part of owners, on noticing the first symptoms of the trouble, will prevent any serious loss. The disease appears more prevalent among milch cows than steers, but the per cent. of fatalities does not exceed 2 per cent. of the animals affected."

The following are some of the reports:—

The mysterious Hoof-and-mouth disease that is so prevalent among cattle over North-western Iowa (says *Coleman's Rural World*) is in full force in Des Moines County. Nearly 200 cases have been reported. The disease is found in all parts of the country, and is quite prevalent over in adjacent Illinois counties. The dairies around Middletown, Danville, Augusta, and other places have been attacked, and the healthful supply of milk is greatly diminished. The State Veterinarian has been notified of the situation, and has signified his intention of investigating the trouble. There is a good deal of uneasiness regarding the use of infected milk, but as a strict quarantine is kept on the diseased animals, it is not probable any sickness will result to the people through the use of milk from infected cows, as almost the first symptoms are a drying up of the milk glands. In the less severe cases the flow of milk is not entirely suspended, and begins again during convalescence. There is more danger in the milk drawn at such time, as has been demonstrated in the case of calves, which became sick after having been allowed to suckle from convalescent mothers.

A report to the same paper from Bloomington, Ill, dated July 30th, says:—"The mysterious cattle disease which has been reported at several places near this city and elsewhere throughout the State has got among the cattle of Mr. E. Brock, near Heyworth. One animal has already died from it."

A Sumner, Ill., report, written about the same time, states:—"The herds of Lawrence County are rapidly dying off, some unknown but virulent malady carrying off stock by the hundreds. Fifteen minutes after cattle are attacked by the disease they are dead. Last week, within a range of six miles of this place, 100 head of stock were carried off. Inspectors have been asked for, and beeves will be examined before butchers will be allowed to dispose of the meat. Cattle when attacked seem to be taken with a fit, their muscles become rigid, and death comes to their relief within fifteen minutes after the appearance of the malady. The disease is spreading with great rapidity, and scarcely a herd but has lost one or more head of cattle. So great is the alarm here that citizens will purchase neither butter nor milk from farmers unless a guarantee is given that their herds have not been attacked by the disease."

The *Breeders' Gazette* of Chicago remarks that "The mysterious disease which is reported prevalent among cattle herds in many sections of the State is now the subject of investigation by the State Veterinary authorities. Symptoms are described by a couple of correspondents in our enquiry column this week, and Dr. Hughes states that the disease is believed to be occasioned by some acrid substance found on the grass. Fatalities are few, but inasmuch as the mouth and alimentary canal become inflamed and ulcerated it is almost impossible for the cattle to eat, and some sections report almost a milk and butter famine in consequence. It is believed by some that the disease is contagious, but a more reasonable hypothesis is that it arises from a common cause in each instance. An Iowa telegram reports a contagious and fatal disease among the herds in Palo, Alto, Emmett, and Kossuth counties which baffles the skill of local veterinarians. Professor Stalker, the State Veterinarian, together with his assistants, has taken the field for a thorough investigation of the disease."

Mr. L. McWhorter, Aledo, Ill., writes:—"The prevailing epidemic among

cattle is raging here with about the same symptoms as elsewhere reported. The trouble exists chiefly among cows, although steers are not altogether exempt. As yet no steers on feed are affected. Cattle taken with the disease first become stiff (as if foundered), their mouths become more or less sore and swollen, causing them to eat little or not at all, and they shrink rapidly in flesh and milk. Veterinarians here say the trouble is caused by fungous growth on grass eaten by the cattle. Few cases have terminated fatally as yet, but much uneasiness is occasioned by the trouble, and the loss from shrinkage in flesh and milk is considerable even when recovery takes place. The disease is very general, few herds being exempt."

At a recent meeting of the Council of the Royal Dublin Society the following resolution was adopted:—"That the Council of the Royal Dublin Society have heard with alarm the reports of extensive outbreaks of Foot-and-Mouth disease in the United States of America, and respectfully urge the Government to take vigilant steps to protect the herds and flocks of the United Kingdom from this serious plague, and that a copy of this resolution be sent to the Chief Secretary and the Minister of Agriculture."—*Mark Lane Express.*

MANGE IN HORSES IN QUEENSLAND.

At the monthly meeting of the Royal Society of Queensland, held at Brisbane on August 7th, Dr. T. L. Bancroft, M.B.Edin., read a paper on "Psoriasis in Horses," known in Queensland as Mange. He said that the importance of the subject was so apparent, that no apology need be offered in bringing it under notice of the society. A great deal had from time to time been written about horse Mange, most of which, however, could only be characterised as absurd. Investigations into its pathology had been made in Queensland, New South Wales, and in India, unfortunately, in each case, by men lacking the necessary ability. Their conclusions were not only erroneous, but in some particulars very misleading. He had studied the disease since 1884, a time, according to some writers, prior to its introduction into Queensland. For a long time he was under the impression that the disease in dogs here called "Mange," particularly common in blackfellows' dogs, might be similar to that in horses, but he now knew that these diseases were distinct. Dog Mange he found to be caused by the excessive increase of a parasite in the skin, the *Demodex folliculorum*. He believed the disease had always been present in horses in the colony, but as attention had not been directed to it, it was generally overlooked. This condition was a skin disease of the scaly or Psoriasis type, closely resembling Psoriasis in man, and, like it, difficult of cure, and prone to reappear after apparent cure. It might be classed as a constitutional disease. It was neither contagious nor infectious in any sense. Affected horses were apparently perfectly healthy in other respects; but as they suffered a good deal from irritation, this might in very severe cases cause emaciation. The cause appeared to be climatic, and the disease occurred almost exclusively in horses that were not stabled or groomed. Mangy horses would generally get well when stabled and otherwise cared for; but they got the disease again if turned out at night. Stabling at night appeared the essential point in the treatment; arsenic internally and chrysophanic acid ointment by inunction should also be tried. Parasiticide remedies appeared to be valueless. The cause had been frequently stated to be the trichophyton fungus, or one closely allied to it. Now, he had never seen a trace of fungus in any of his preparations, and he had made some thousands. The experts in microscopy at the Brown Institution, London, to whom specimens were submitted from Queensland by the Chief Inspector of Stock, were unable to detect any parasite. There was frequently to be seen

a peculiar arrangement of the pigment in the skin, which, with low powers of the microscope, might be mistaken for a fungus, but by careful illumination with the Abbe condenser and with high powers it resolved itself into large branched, pigmented cells. It was not confined to mangy skin, but could be seen in healthy skin also; which fact of itself was sufficient to show it to be a normal condition, and in no way connected with Mange.

HUMAN AND VETERINARY MEDICINE.

OUR excellent contemporary, *The Lancet*, has for years been anxiously striving to bring human and veterinary medicine closer together, and has hailed every advance made in this direction; while its columns have always been open to the discussion of matters in which both branches of medicine have been interested. The late Congress on Hygiene has afforded it good cause for congratulation, and it has more than once given expression to the satisfaction it experienced at finding veterinary surgeons and medical men discussing questions in which both were deeply concerned. In its issue for August 22nd, there is an editorial dealing with the results of the Congress, and in it we find the following paragraph, which we have much pleasure in reproducing, and, at the same time, heartily reciprocating the good feeling which dictated it. For much more than a quarter of a century, all our efforts have been directed towards this closer alliance of the two medicines, and in urging the claims of Comparative Pathology; we therefore sincerely join in the aspirations of our valued and greatly respected contemporary.

This is the paragraph alluded to:—

"The third point to which we would refer is the stimulus to Comparative Pathology and Veterinary Science that has been given in our midst by the formation of Section III., in which were brought together medical and veterinary men in a way that has hitherto not been attempted; and from the hearty manner in which co-operative work was entered into in the meetings of the Section, it may be anticipated that these departments will more and more throw in their lot together in elucidating some of the interesting but abstruse questions that were brought up for consideration during the Congress. The discussion on Tuberculosis by the combined Sections II. and III. was the first of its kind that has as yet been initiated. There has been an officially recognised combination of forces, and, instead of working at cross purposes, an honest attempt has been made between medical men and veterinarians to arrive at what will be the best for the community, quite apart from any class interests. Of such discussions nothing but good can come, and if, in their endeavour to unite science with practice, those who took part in this discussion have been able to show the necessity for the formation of a department for the regulation of the inspection of cattle, even though no legislation be immediately carried out, much will have been gained."

THE SHOEING OF HORSES FOR MILITARY PURPOSES.

BY GEORGE FLEMING, C.B., LL.D., F.R.C.V.S., PRINCIPAL VETERINARY SURGEON.

(*Continued from page* 434., *vol. xxxii.*)

These examples will, perhaps, be sufficient to illustrate the influence the art of shoeing has in maintaining the efficiency of armies, and what grave calamities may ensue, when, from lack of foresight, or through ignorance or carelessness, any of its details are neglected, and soldiers are helpless at a time of grave emergency.

What can be more discouraging to an army in retreat, than to be compelled to leave its feeble, sick, and wounded men, and its guns, ammunition, baggage, and stores, to be destroyed by the weather, or to fall into the hands of perhaps a merciless enemy; when some simple device, suitable to the occasion, would have saved them? The destruction of the horse and its rider, or the loss of a city for want of a horse-shoe nail, as mentioned in the proverb, is a mishap not so improbable after all.

There are various appliances for securing a foothold on ice or slippery ground, but the majority of them do not meet all the requirements that must be provided for. The ordinary method of "roughing," by taking off the shoes, heating them, and turning up a sharp calkin—in some cases welding on a sharp toe-piece, is most objectionable; because it damages the hoofs, requires much time, is very expensive, and only lasts for a day, when the operation has to be repeated. It was the only method we had in the Crimea, but it had to be given up as impracticable, and our mounted corps there in the severe winter of 1855-56 were, it may be said, immovable—utterly helpless. The screw-pegs which the Germans used in 1870-71 are an old invention; but they have their drawbacks in being expensive and require much preparation, while if they are screwed too far through the shoe they are likely to lame the horse, and they are also liable to break at the neck.

Frost-nails, if driven through the hoof, damage it, and if only fastened through the shoe, are apt to wound the horse's legs; while they are soon worn away.

Seeing the necessity there was for having some fixed system of winter shoeing in the Army, for more than a quarter of a century I have endeavoured to introduce a method which would meet every requirement, having tried all the others. About fifteen or eighteen years ago, when with the Royal Engineers at Chatham, I used steel pegs of a pyramidal shape fitting into square holes in the shoes. These answered admirably, and during the winter months the mounted corps employing them were quite independent of the weather and the farriers, as every man could render his horse secure against slipping in a few minutes. To ensure greater accuracy in the peg fitting into the shoe, in recent years I have had the shank and hole round, and this change appears to have made the system perfect. A peg is placed at the end of each branch of the shoe for riding horses, and for draught horses one or two in the toe. The pegs are of three sizes, are of tempered steel, and can be removed or inserted into the shoes speedily and with the greatest ease, by the soldiers themselves. By their employment a whole army could be rendered capable of moving at any speed over the most slippery surface in a few minutes, without the aid of farriers—for I maintain that no system of winter shoeing is perfect which requires the intervention of the farrier. While in the 2nd Life Guards, I had the horses shod with the prepared shoes all the year round, blunt pegs being worn in summer to prevent slipping on the London streets, and sharp pegs if there was ice.

And this leads me to observe, that considering the very slippery character of the street pavements in our towns and cities, and the danger to horses travelling on them, and especially if troops have to act in suppressing riots, the desirability of having the shoes issued for everyday use all the year round prepared for these pegs, is a matter for consideration. At any rate, shoes for winter use should be so prepared; as at present, during frost and snow, troop horses cannot leave their barracks, whereas they should be able to travel at all seasons of the year in any climate.

As I have stated, all the ordinary methods of winter or frost shoeing are more or less objectionable, either because of the time required to effect it, the damage done to the horses' hoofs, the expense, the inefficiency, or the complexity of the means. What is above all needed, is a method which is

at once so simple that it can be immediately applied by every trooper without recourse to farrier or forge; and so durable and effective, as well as safe and inexpensive, that it will cause but little inconvenience in using, or cost in providing.

This method appears to fulfil these demands. It is so inexpensive, that for a few pence a horse can travel securely at any pace on ice for a month, and it is so simple and readily applied that the horses of a whole army corps can be prepared for marching on the most slippery roads within half-an-hour.

It has been put to severe tests by myself for many years, and it has been tried repeatedly and successfully at home in Cavalry and Transport. One of these trials was in the 4th Hussars at Edinburgh and Glasgow three years ago, during a severe winter. The report was: "The cogs (pegs) are easily put in and taken out; very few have been lost, and none need be if they are carefully put in. They are also easily sharpened when worn down, and they last well." The horses so shod travelled on the ice and snow-covered roads nearly every day without accident, and with absolute safety—the men putting in the pegs on leaving the stables, and taking them out on returning to barracks, without the intervention of the farriers.

I may add that the Swiss Army has adopted our new system of shoeing, pattern of shoes, and appliance for enabling horses to travel on ice and slippery roads; and from a letter received from the Director of Artillery, Colonel Schumacher, the results were very marked during a recent trial. He writes:—

"On February 18th we assembled at Burgdorf, the 4th Regiment of Cavalry (three squadrons) and two companies of guides. All the horses were shod anew, cold, with newly-ordered shoes from London (Greenwich); the holes for the pegs (Fleming's) were drilled in Thun, and the pegs were furnished from Vallorlies—all on the shortest notice. The farriers shod about nine or ten horses each per day, and on the 21st all went off for three days through the lower mountains, with ice and snow a yard deep everywhere. All went well, and even the wagons were able to follow. Our new shoeing is a success, notwithstanding that all of Dr. Fleming's ideas were not adopted by all the members of the Shoeing Commission. The French were, I hear, very much surprised at the system working so well, especially the winter shoeing."

It is a matter for regret that in towns which have slippery roads all the year, advantage cannot be taken of a simple plan like this to economize horses' powers, and spare them distress, fear, and injury. It is very painful to pass along some of our streets, and witness the amount of horse-torture and loss of power that occurs during certain states of weather; and it certainly does not say much for the common sense or humanity of those who shoe the horses or construct the roadways. It surely would not be undignified or degrading to adopt a hint from the Army, and guarantee the poor horses who have to toil on wood pavement and asphalte from cruel injury.

The Rev. THEOPHILUS BENNETT: I am sure if a horse could speak, he would thank the worthy lecturer for the very excellent paper he has delivered on the present occasion, and I would like to be voice for the horse, and thank him from the bottom of my heart for it. I have often wondered why a horse-shoe,—in Ireland especially,—is generally looked upon as an emblem of luck, and I never knew the reason until I heard it to-day. We find that for want of a nail the shoe was lost, for want of a shoe the rider was lost, and for want of a rider, I suppose, the city itself might be lost. Hence, I think, it is that the horse-shoe is an emblem of luck. Then, with regard to shoeing, I think the farrier requires to be a very intelligent man. We often see that the veterinary surgeon requires to be a cleverer man than the human surgeon, and why? The human surgeon can ask his patient what is the matter with

him, but the veterinary surgeon has to find it out for himself. I think it is the same with the farrier. If I go to my shoemaker and the shoe pinches me, I can tell him, but with the poor horse, if the shoe is badly put on, if it is not a good fit, he cannot tell him, and, therefore, I maintain that the farrier requires even more cleverness than the shoemaker. And then I often wonder how it is that horses seem to like to be shod so much. I often have the treat myself of taking a horse to the forge. I like to take him and see him shod, and I have often wondered at the alacrity with which he allows himself to be taken to the forge. I think it is that he rather likes it, and, therefore, I think those who are horse-owners ought to shoe their horses regularly and not to care for removing a shoe, paring the foot, and all that, and putting on the old shoe again. If we shoe them regularly once a month, their feet require very little attention, except on the occasion when the horse is shod. I have also found that when horses have a tender sole, it is often desirable to shoe them with leather. I quite approve of everything that has been said with regard to winter shoeing. I think it is a very good plan to have the horse shod in winter in such a way that you can remove the screw, and put in an ice chisel; then you have no trouble all through the winter. Your own groom can remove the little thing that is put in as a spike, and in its place put in the ice chisel, and that ice chisel I have found very effectual in winter in keeping the horse from slipping. I quite approve of what the lecturer said about the steel pegs. There is only one other subject I wish to allude to, and that is as to whether indiarubber might not be introduced advantageously in horse-shoeing.

Mr. LANCASTER: Mr. Chairman, ladies, and gentlemen, I did not expect to say anything when I came here, but after what the Professor has said, I think I am in a position to say a few words. I am not a farrier, but I am an amateur horse-shoer, that is, I have seven or eight horses of my own, and for years I have turned my attention to improvements in shoeing, and have spent considerable time and money in this way. In the first place, there is no doubt that these spikes are very good things, but I am surprised to hear the lecturer say that the blunt spikes will prevent a horse from slipping, because I have made inquiries of those who had used them, and find that after the edge has worn off, they slip as badly, or worse than the common shoe, because there is not that surface exposed to the road. I have had considerable experience in trying various horse-shoes. You know that Douglas in his horse-shoeing work recommends shoes with channels. I have tried various channelled shoes. A gentleman spoke about indiarubber. I tried indiarubber. It is a very good thing on the asphalte, but it is not so good on a wood pavement, and on a piece of macadam the indiarubber is all gone in half-an-hour. I do not think that indiarubber, or any composition of indiarubber, would stand an hour on macadam pavement; therefore, if you want something to stand on all pavements you must find something else. I came to the conclusion at last that wood cut across the grain is the best anti-slipping substance that can be. Four or five years ago I took out a patent for this. I had an office and tried it for three years. I had it on my own nag horse, which I drove early in the morning through the streets of London. I have been on the wood-pavement, on the asphalte, and on the macadam on frosty mornings when it has been very slippery, and scarcely a horse could stand, and I have invariably come through the streets without slipping at all. I had gone for nearly twelve months without slipping, and I congratulated myself upon the good fortune I had. I can say that I have driven my horse for twelve months and that it has not slipped once. I was, however, on one occasion surprised and disappointed to find my horse did slip. But when I got home and had him examined I found that, unknown to me, one of my new shoes had come off, and they had one of the old-

fashioned shoes put on, and that was the cause of the slipping. Some gentleman wished to see it tried, and I took a very heavy wagon of manure—I am connected with land—up and down Ludgate Hill, and then they wished to see it further tried, and I went to Tooley Street, and there I suppose is the worst hill we have about London, from Tooley Street up to London Bridge. It happened to be a damp day, and the wood pavement was very slippery, but the horses went up the hill and over the bridge without any slipping at all, and the gentlemen were quite satisfied. I may be asked, why has not this plan been adopted? Well, unfortunately I had got into the hands of what I suppose you may call schemers, gentlemen who having got the cow to milk have kept on milking it for their own interest, and the end of it was that the solicitors of the gentlemen who found the money put a stop to it—the fault was not in the shoe, but with those who were going to bring it out. I am sorry I have not a shoe here; but since then I have still persevered, and I have a shoe which I am now trying, and have been trying for two or three months—the same shoe with this addition, that it is put on without nails, and after four or five different trials I have got the thing as nigh perfection as it can be. I will not say that it is all perfection, but in the course of a fortnight or three weeks I hope to be able to exhibit this shoe, and to show that it is a real anti-slipping shoe, and one that requires no nails to fasten it. Although I have been very fortunate of late years, still I remember that I had three horses that got pricked and died within twelve months, and there is no compensation for it. Farriers are very often poor men, and if you go to law with them, you get the worst of it, so that you have to put up with it. I think it will be a good thing if we can do without nailing a shoe on. With this shoe of mine a handy man would learn to put it on in a day, and I do not see why the time should not come when each horse soldier shall be able to put his own shoes on, and I am sure you will acknowledge that it would be a capital thing in war for every man to be able to shoe his own horse. I intend to exhibit the shoe in the course of a few weeks, and you will perhaps be able to see it then—at the Exhibition of Horse-shoes at the Animals' Institute, Wilton Place, Kinnerton Street, Knightsbridge.

Major TODD, Middlesex Artillery Volunteers: I think from the humanitarian point of view alone that this question is well worthy of discussion in this hall. It has been commenced by an admirably written paper by Dr. Fleming to-day, which might well lead us to ask ourselves why we cannot use shoes without nails. From the very commencement of keeping horses I always found that accidents were happening by pricking horses' feet, and I have no doubt whatever that that was the cause, either directly or indirectly, of a great deal of disease in their legs. I must say that my experience has been rather different to that of our friend, whose horses always liked to go and be shod. I have found that a horse has objected to enter the forge because it had been so badly used by putting on the shoe and burning the hoof, in order to make the foot fit the shoe instead of the shoe fitting the foot. I have had to get rid of two horses at different times, solely from the fact that they objected to go into the forge, and fought and kicked terrifically when they were there rather than be shod. I was very glad to get shoes on them again and send them up to the hammer. I cannot help thinking that a shoe fixed with nails must be a great bane to the horses' health, and I know it is a great bane to the horses' owners to find that they had had horses pricked, and consequently they had to send them to the salt marshes or out to grass for some months in order that they might recover to some extent. Therefore to get a horse-shoe adjustable without nails I thought would be the *acme* of perfection. For twelve months I have used my horses shod with shoes without nails.

I saw the nailless shoes exhibited at a show, and took the opportunity of discussing the matter fully with the man who was showing the patent from almost every point of view, in order to hear what he had to say about it. Of course when one sees a new invention of that sort, one is apt to think that it cannot be perfect, but I have no hesitation in saying that I have found in the twelve months that I have used those shoes that they are simply perfect, and have borne out every statement that has been made with regard to slipping, and with regard to having no particular indiarubber patent pad to fill up the space that has been cut from the frog, etc., by the blacksmith. Further, I was at the Agricultural Hall last year at the Military Tournament, and my horse's feet, shod with the nailless shoes, were examined by military officers, and they were surprised to see how beautifully the frog had grown down and how sound the foot had become, and that when the horse travelled, whether on asphalte or on soft stuff, there was no place left for snow to ball in, no place left for a stone to get under. To cut away the frog seems to me most ridiculous, if not worse, for if you take up almost any hoof with a patent shoe upon it you will see that the horse's hoof has been made by the hand of man a very different thing from what it was by nature. You can see no frog in many cases, and in some cases the horses through having a frog continually cut away have got terribly injured and never recover, and very likely have to be poleaxed from that reason alone. If my horses were to die to-morrow and their feet taken off you would see the natural horse's feet, with the natural soles and frogs, with grooves round the outside edge for the shoe. The best natural shoe fixed with nails I ever used before I adopted this nailless shoe was a shoe brought out by a veterinary surgeon, who called it the Rational Horse-shoe, because he allowed the frog to grow completely on to the ground, and there you have the advantage of non-slipping, because when the frog is on the ground, the horse does not slip. I proved it every day last week with a horse and victoria upon asphalte and roads of all kinds, and, though I saw horses down in all directions, my young horse, only five years old, travelled with perfect impunity. That is the best proof that you can have. I have two draught horses shod in the same way, and I should be very sorry indeed to go back to the old system of nailed shoes. I can only express my hope that we shall shortly be able to get the shoes at a reasonable price, and made out of a good metal. It is not a question of what kind of shoe you shall have; it is whether you can adjust the horse-shoe to the foot without the horrible hammering of nails into the beautiful hoof.

Mr. F. Duck, Army Veterinary Department: Mr. Chairman, Dr. Fleming and gentlemen, I should like to add a few words in corroboration of what Dr. Fleming has said as to the system of cold shoeing. In South Africa in the Jaika and Galeka and Sekukuni War of 1878, we always had great difficulty in keeping horses useful and efficient for want of proper shoes and of farriers to put them on. The shoes and the nails of the old regulation pattern were too large for the small colonial horse, and we had to obtain shoes locally; those were of a very inferior quality. Then, as to the shoeing, the farrier gets in South Africa in private life perhaps 25*s.* a-day, and we never could persuade any of them to volunteer. The result was we were very much put to it to keep the horses going. For army horses it is always advisable to have them shod in the hind feet as well as in the fore feet. In the Sekukuni War we found this to be absolutely necessary. The colonial horses never in their lives had shoes on their hind feet. Many of them at twelve or fourteen years of age would come back from a long patrol over hard ground, as tender as possible; the hind feet presented the appearance of having been rasped, almost ground away, and blood coming through in spots both at the frog and at the toe. In the Bechuanaland expedition in 1885 we took a supply

of the new pattern cold shoes, and also a staff of trained farriers. For the colonial horses these shoes answered admirably; they could be worked either hot or cold. I have often seen a man alter the shoe on a waggon wheel and occasionally upon a stone, that is alter the shoe cold. Even the farriers could say nothing against them, and they are the most conservative of men. I remember asking a farrier, "What do you think of these shoes?" "He didn't think anything of them; they were bad." "Why?" "He did not know." "Did they work well?" "Yes, they worked well." "What fault do you find with them?" "Well, I don't know, except that they will hurt our trade, and therefore we are all dead against them." The trained farriers that were sent out were a most useful set of men, and in addition to the shoeing, they enabled the veterinary officers to assume a much larger charge; they gave them much more time to attend to the duties of the department, in fact, in the Orange River expedition we had always complete veterinary supervision. The casualties amongst horses, mules, and transport animals were very much less than they had been in any previous expedition in South Africa. In the Zulu and Boer Wars, the losses were very great, I am afraid to quote them; but in Bechuanaland the percentage of loss was 6 per cent. horses and mules, and only 7 per cent. in the transport animals. Possibly for these small percentages, the veterinary staff may claim a little credit.

Mr. W. B. WALTERS, Army Veterinary Department: There are one or two points I should like to make a few remarks upon with reference to Dr. Fleming's lecture, and in support of what he has said with reference to the new system of shoeing, and the reorganization of the farriers' department. With regard to the new system of shoeing, Dr. Fleming has quoted from my report on the Suakin Campaign. That was the first campaign, I think, in which machine-made shoes were used. If I remember right, we had some little difficulty at first in procuring the shoes from the field stores, but afterwards, we had no trouble in keeping the horses properly shod. Had the campaign been extended, and the march across the desert to Berber taken place, it would have been impossible to have kept the horses properly shod up under the old system, because we could not have possibly dragged heavy forge waggons, coal, nails, iron, and all the plant necessary for horse-shoe making through the desert. Consequently, I consider, for active service, the new system is as simple and perfect as any that could possibly be devised. I have had some experience in the trials that were made before and after the Suakin Campaign, because during the time I was in charge of my department in Ireland, I was entrusted with the experiments that were carried on in Dublin. These experiments were conducted by two regiments, the 18th Hussars and the 16th Lancers. Both regiments were ordered to shoe "cold" for a given period, and no fires were allowed to be used. Notwithstanding this, I think I may say that horses were never shod more perfectly than those of the two regiments I speak of. On one occasion the General Officer Commanding, Prince Edward of Saxe-Weimar, intimated that he should like to see the working of the new system, and on a given day one horse per troop of the 16th Lancers was paraded in the barrack yard; these animals were shod by their own farriers. The old shoes were taken off, the feet prepared, new shoes altered to fit, nailed on, and the whole operation finished in a very short space of time, the longest time occupied being thirty-five minutes, and the shortest fifteen minutes, from beginning to finish. When it was necessary to alter the shoes for the purpose of fitting, this was easily done upon the wheel tire of a squadron cart. The horses were carefully inspected by the General Officer Commanding, and also the officers of the regiment, and the result was most satisfactory. I think this is quite sufficient to demonstrate the excellence of the new system. With reference to the durability of the shoes, I found that they lasted—with ordinary wear—

from thirty to sixty days, but they were not put to any severe trial, and the shoes were allowed to wear out completely. The regimental farriers were certainly not in favour of the new method of shoeing at first, because the abolition of the contract system represented a pecuniary loss to them, but that, I am glad to say, has been successfully tided over, and the very men who were opposed to the system are now the first to recognize its advantages. As Mr. Duck has already observed, farriers are a very conservative race, and naturally object to any new system, especially when it touches their pockets. That is now, however, a thing of the past as far as cavalry is concerned. The system is to be extended to the artillery and other mounted corps, and I very much fear we shall experience the same obstacles from the farriers as we met with in the cavalry, but I feel convinced that if the matter is taken up in a proper spirit all dissatisfaction will as speedily disappear. I remember well the shoes sent out to South Africa for use during the Zulu Campaign. They were hand-made and very inferior, so much so that very few could be applied without heating, and in many cases it was necessary to entirely remake them. The trouble and inconvenience thus caused can readily be conceived. The great advantages of machine-made shoes are the ease and celerity with which they can be altered and fitted without heating, their uniformity of make, and also their durability, from the mode in which the iron is manipulated during manufacture. As regards the second point– if I may call it so—of the lecture, the reorganization of the farriery system is a most important movement. The experience of former campaigns has taught us that farriers are generally the first class of men to succumb to the hardships of war service, and that under the old system it was simply impossible to keep the horses properly shod up, or to provide skilled assistants in sufficient numbers for hospital duty. Under the new system we shall have a number of trained men in the ranks available for shoeing purposes, and a staff of farriers efficiently instructed in the details of hospital duties. We know that in war-time corps are frequently formed, such as mounted infantry or auxiliary cavalry, and these corps require farriers, but formerly they could not be provided without depriving the mounted corps of the Army of men which they could ill spare. The present system provides for this difficulty. Another point of importance is that as an army advances, veterinary hospitals must be established along the lines of communication, and for this purpose we shall now be able to place our hands upon a number of trained hospital assistants in whom every confidence can be placed. This is a very important point to look at, because we know perfectly well that without men who thoroughly understand the care and management of sick and lame horses, it is impossible for a veterinary officer who has miles of country to travel over every day, to do his duty satisfactorily, either to himself or to his command in officers. (*To be continued.*)

INTERNATIONAL AGRICULTURAL CONGRESS.

An International Agricultural Congress met at the Hague, Holland, on September 7, to discuss matters more or less connected with agriculture, England being represented by Mr. Ernest Clarke, Secretary of the Royal Agricultural Society, and Mr. C. T. Parker, President of the Dairy Committee of that Society.

Two questions of considerable importance were discussed on the 10th, viz., Tuberculosis and Pleuro-pneumonia. The first was introduced by M. Ibaccius, a Swiss delegate, who recommended the Congress to take energetic action at once with a view to stamping out the disease, wherever it might be

found to exist. The first thing to be done, he argued, was to disseminate in the widest possible manner among farmers, stock-raisers, and dairymen, detailed information as to the practical measures which should be taken to prevent infection of healthy animals by those suffering from Tuberculosis. These recommendations should be circulated without delay, and with the authority of the Congress, and it was further necessary, he contended, to fit up in slaughter-houses an apparatus through which all meat should be passed, in order that such Tuberculosis germs as it might contain should be destroyed, agriculturists being unable to bear the loss involved in the wholesale condemnation of the carcases of animals which had been in contact with infected stock. These proposals having been embodied in a resolution, Mr. Ernest Clarke, secretary of the Royal Agricultural Society of England, suggested that it should be modified in so far as the last mentioned measure was concerned. On his motion the Congress resolved rather to formulate a demand for the payment of a Government indemnity to the owners of all cattle seized and condemned on account of Tuberculosis. With this modification the resolution was adopted, as was also a motion proposed by Count Kolourfat (Austria) in favour of the general insurance of agricultural stock.

The question of the means of extirpating Pleuro-pneumonia was raised by M. Ruysch, councillor of the Ministry of the Interior, who presented a report recapitulating the rigorous measures which had been taken in Holland to stamp out the disease. These measures had proved so successful that he recommended their general adoption in other countries. The first was the complete isolation of all countries where Pleuro-pneumonia was suspected to exist, constant and rigorous surveillance by Government inspectors, the immediate slaughter under proper regulations of all infected animals, the destruction by burning of all the diseased organs, and the thorough disinfection of all byres, trucks, and other places where the diseased animals had been. Mr. Cecil T. Parker, president of the Dairy Committee of the Royal Agricultural Society of England, took exception to the proposed resolution on the ground that regulations which would exclude from one country animals coming from another which had been declared free from the disease were vexatious and unjust. In a country with frontiers so extensive as Holland it was almost impossible to be able to declare that the danger of contagion no longer existed. The resolution, however, was adopted.

The Congress agreed to a motion, proposed by M. Ibbaccius, expressing a wish that slaughter-houses might be provided with apparatus for sterilising the carcases of animals which had been in contact with infected cattle.

THE AGRICULTURAL DEPARTMENT'S TRAVELLING INSPECTORS.

SOME merriment, much sarcasm, and perhaps more indignation, have been evoked by the extraordinary whim of the Government Agricultural Department, in the selection of travelling inspectors charged with the duty of superintending the stamping-out of outbreaks of contagious diseases among animals, and particularly of contagious Pleuro-pneumonia. All kinds of odds and ends have been picked up for this service, and perhaps a more incongruous lot was never got together for work of the kind. We do not need to inquire what has been the motive underlying such a selection, nor whether the affair is a job. Certain it is, that anything more discreditable has not occurred in the not very creditable history of our manner of dealing with the contagious maladies of animals. The claims of veterinary surgeons to the appointments have been entirely ignored, though they are in every way better fitted for such a function than the heterogeneous group which has been,

through diverse influences, got together to carry out a task that is costing the taxpayer such a serious outlay, and which will yet demand much more than has already been expended. We have been informed—and an instance has been adduced in support of the information—that veterinary surgeons are not considered eligible for the appointments of travelling inspectors, and therefore need not apply. Fancy the Local Government Board daring to employ such individuals to report upon and suppress epidemic diseases! What would the medical profession say and do? But that Board is too enlightened to perpetrate such a job, and its medical adviser is sufficiently loyal to his profession to prevent such a slur being cast upon his calling or his office. We may well ask what encouragement there is for gentlemen to enter our profession, when the Agricultural Department thinks fit to insult it by preferring the services of untutored amateurs, and places its members under their direction in the performance of work which is made as degrading as it well can be otherwise. Surely the House of Commons will think fit to enquire into such an extraordinary business when it next meets! We are glad to observe that the public press is taking the matter up, and if the veterinary profession had only one-half the *esprit de corps* that characterises the sister profession, the matter would quickly be altered. However, it is not likely that it will be allowed to rest, judging by the press utterances; and when the public are made fully acquainted with the facts, they will probably ascribe the miserable progress made in extinguishing the Lung-plague—notwithstanding the sickening slaughter that has been going on at such a serious cost of money—to the unsuitable tools employed to accomplish the work.

From among the number of notices of the transaction which has appeared, we select only two as a sample; but they give no indication of the feeling of the veterinary profession, which we have heard expressed in language deep and bitter.

The *Mark Lane Express* has the following:—

"It is assuredly rather interesting to note the nature of the previous occupation of the fourteen gentlemen who, at a salary of £300 a year, are now required to perform the duties of inspectors under the Contagious Diseases (Animals) (Pleuro-pneumonia) Act of 1890. I may briefly point out, however, in a few prefatory sentences the character of their inspectorial duties. They have to report on all circumstances connected with each outbreak of Pleuro-pneumonia, arrange for the valuation and slaughter of cattle condemned by the Board, and the disposal of the carcases, trace cattle that may have been exposed to infection, and afterwards moved to other parts of the country, and generally carry out the instructions of the Board of Agriculture on matters connected with the Act. Of course veterinary surgeons, valuers, slaughtermen and labourers can be engaged to assist them. I have stated that their salary is £300 a year; but I should also explain that they are each granted a subsistence allowance of 20s. per night when they are necessarily absent from home, and a daily allowance of 3s. 6d., together with the actual cost of locomotion.

"Well, what was the previous occupation of these rather pleasantly-situated gentlemen? Two only—Mr. Francis Henry Davenport and Mr. William Gordon—are described as farmers. However, five have the description of 'farmer and land agent' attached to their name. This quintet is composed of the following:—Mr. Arthur Wellesley Anstruther, Mr. W. Dawson, Mr. Hubert Brian Hill, Mr. Rowland F. Meyrick, and Mr. Martin Mason Reynard. One gentleman has followed the legal profession; Mr. Ernest George Haygarth Brown was a barrister. Two can shoulder their arms, and no doubt show us how fields are won; Major Charles Barrett Knapp and Captain Gerald Robert Spencer were both attached to the regular

army. Two have no doubt sailed the main with glory to themselves and advantage to their country; Captain George Stamford MacIlwaine and Lieutenant William Henry Chamberlain were both connected with the naval service. The thirteenth gentleman, Mr. Athole Augustus Chichester, was also a sailor, and no doubt a valuable member of the mercantile marine; and the fourteenth gentleman, Mr. Francis Algernon Fulford followed the dual callings of a civil engineer and land agent.

"The lesson of this is that even so admirably sympathetic an administrative body as the Board of Agriculture apparently believe that in the administration of a measure which closely affects the health of our herds, the uncontaminated purity of an important source of food-supply, and the prosperity of the farmers, and in connection with which a certain amount of technical knowledge should be possessed, it is only necessary that one-half of the inspectorial force should be farmers. The other gentlemen may, for aught I know, be skilled agriculturists and keen veterinarians—aye, even the gentlemen who have trod the quarter deck, or who have been trained in the vocation of the soldier, or the gentleman whose studies have been devoted to Blackstone and Archibold. I will not say that they are not every whit as efficient as the farmers. But the Johnsonian philosophy that 'he who drives fat oxen should himself be fat' is not unworthy of reverence to-day; and I emphatically believe that matters which so closely affect our herds and our herdmasters, agriculture and agriculturists, should be placed under the control of farmers. I would rather trust a farmer on matters concerning farming than a soldier or a sailor, a barrister or a mercantile mariner. These be heretical opinions, I know: and, if the aforesaid inspectors deem them personal, I offer an apology."

One of the other press notices quotes *Truth* in the following extract:—

"There are loud complaints of jobbery at the Board of Agriculture, where Mr. Chaplin commenced operations by pitchforking his private secretary into the office of assistant-secretary with a salary of £800 a year.' It seems Mr. Chaplin has recently appointed fourteen cattle-inspectors at a salary of £300 a year each. They ought to be skilled farmers, who know all about the diseases to which cattle are liable, for they have to investigate all cases of disease that occur. For this purpose Mr. Chaplin has appointed two military officers, two naval officers, one barrister, one merchant sailor, and a lot of 'land agents.' A few musicians should have been added, as they would at least have been able to tell 'the tune the old cow died of' when they heard it."

We fear our profession has fallen on evil days, and there is good reason for predicting that the evil will be intensified as time goes on. Individual selfishness, double-dealing and duplicity, and a resort to low tactics to achieve unworthy ends, seem now to control the progress of the profession; consequently, that progress will be—must be—downward. Has it seen its best days in this country? Recent events would tend to demonstrate that it has. At any rate, the upward or downward course pursued is adopted by the profession itself; it has taken many years of anxious and intelligent toil to raise it, but it will need but a short time to degrade it to a far lower level than it has ever occupied.

THE FITZWYGRAM PRIZE COMPETITION.

THIS competition took place at Edinburgh on June 18th and 19th, and August 6th, there being seven competitors in the first and five in the second portions. The result was that C. Haywood, New Veterinary College, was awarded the 1st Prize (£50); J. H. Manton, Royal Veterinary College, the 2nd Prize (£30); and W. Pye, Dick Veterinary College, the 3rd Prize (£20). The examiners were F. Raymond, F.R.C.V.S., Army Veterinary Department, and J. B. Gresswell, M.R.C.V.S., Louth.

Proceedings of Veterinary Medical Societies, &c.

SOUTH DURHAM AND NORTH YORKSHIRE VETERINARY ASSOCIATION.

THE third annual meeting of the members of this Association was held at the North-Eastern Hotel, Darlington, on Sept. 4th. Mr. W. Awde, president, occupied the chair, and there were also present Professor Pritchard, Messrs. A. Hunter, W. Hunter, G. Elphick, J. W. Moore, W. A. Hancock, H. Hunter, Newcastle; W. Stevenson, Whitburn; G. R. Dudgeon, Sunderland; A. Peele, West Hartlepool; H. Snarry, York; P. Snaith, Bishop Auckland; H. Gelsthorpe and F. R. Stevens, Darlington; J. Nettleton, Northallerton.

THE INSPECTION OF DAIRIES AND SLAUGHTER-HOUSES.—A FARCE.

The PRESIDENT then read his address, in which he thanked the members for the honour they had conferred upon him. He said the Association had just entered on its third year of existence. It was, as they knew, an offshoot from the North of England and Yorkshire Association, and several of their members still belonged to the parent stems from which they had sprung. He was glad to find that the little feeling which was manifested when they first seceded had passed away, as was evidenced by the presence of the president and members of the North of England Association that day, to whom they offered a most hearty welcome. They would be glad to see them at their meetings, and taking part in the discussions. Their numbers were not so large as they could wish, but they hoped to see them increased, as there were still several members of the profession in the district who were not members of any existing association whom they hoped might be induced to join them. He was convinced that these associations did a great deal of good, by bringing the members more into contact with one another, and by the diffusion of practical knowledge. It was not his intention that day to deal so much with matters within the profession, but rather to call attention to the way in which the public bodies of this country carried out the duties imposed upon them, as guardians of the public health of the cities and towns with which they had to deal, and to show in what way they might be improved. He had no special claims to attention on these matters, but, as an individual, he had an interest in the public health of the community to which he belonged, and as a professional man he saw matters that required alteration and amendation, and therefore he was justified in calling attention to them with a view to their being remedied. It had been known for some time that the tubercle bacillus of animals and man was identical, and that it was possible for persons to contract the disease from drinking the milk from tuberculous cows, and it was quite possible, though not so well established, that they might also be infected from eating the flesh of diseased animals. He was bound to say that the system of inspection of these two articles of food was not what it should be, for the sake of the public at large. To show the importance of this subject, he might say that Professor Burdon Sanderson stated, in his paper read before the Congress of Hygiene and Demography, that from statistics it is shown "that 14 per cent. of the deaths recorded of the human population are due to Tuberculosis. The deaths are found principally in infancy before four years, and between twenty and thirty years" How much of this infantile mortality is due to the consumption of tuberculous milk, it was impossible to say; but Professor Walley, a few weeks ago, stated that he had kept a record of the animals slaughtered under the Pleuro-pneumonia Slaughter Order, and that in milch cows from the Edinburgh dairies

the proportion affected with tuberculous disease was over 30 per cent. Professor Arloing, at the recent Paris Conference, showed that out of every six carcases of beef one was tuberculous; so that the importance of the subject could not be lightly estimated. As there was almost as much danger from the consumption of butter and cheese as from milk, one would naturally expect that the authorities would stringently carry out the provisions of the Dairies and Milk Shops' Order, 1886, which was designed to improve the sanitary conditions of cows kept for dairy purposes, by providing that 800 cubic feet of air was allowed for each cow, and that the drainage and lighting were to be properly attended to. A good water supply was to be provided, and the utensils used in the purveying of it were to be properly cleansed with boiling water. At present this Act was carried out in a very lax manner indeed, and it was only applied to persons selling milk in towns. It required to be amended and extended, and should apply to the sanitary conditions of all cows, no matter whether kept for private use, public sale, or the manufacture of cheese and butter. It was well known that similar conditions spread the disease both in man and animals, and where cows were crowded together in badly-ventilated byres, with little or no light, and sanitary arrangements *nil* or defective, it stood to reason that if there was one animal there affected with tubercular disease of the lungs, the probability was that the disease would be spread to the other animals in the byre. The disease being hereditary, it was manifest that these animals should be periodically inspected by a qualified veterinary surgeon, and any animal affected, or suspected of being affected, with the disease should be isolated, and should not be bred from. The duties under the Act had been placed on the shoulders of the sanitary inspector in many cases, and his knowledge of the disease was *nil*, while he had no power, if he found an animal emaciated, and probably in the last stage of the disease, to order its removal, or stop the owner from using its milk for the food of man. If the course which had been indicated were to be carried out and the Act properly administered, the danger arising from the consumption of milk would be considerably diminished, and the cattle of this country would materially increase in numbers and value. If thorough cooking could be ensured, the danger arising from the use of the flesh would be very slight, but as many persisted in eating it almost raw, a thorough inspection of it should be insisted upon, and he thought steps should be taken to make it more easy and more effective. The inspection of slaughter-houses and meat as at present carried on was a farce. The private slaughter-houses were so far apart that, as slaughtering was going on in nearly all at the same time, it was impossible for the inspector to more than cursorily examine them. He would welcome the day when private slaughter-houses were done away with, and public ones or abattoirs instituted in their places. A thorough inspection could then be carried out by a duly-qualified veterinary surgeon, who was the proper person, from his training, to conduct it. He thought that in the future there would be district veterinary surgeons, as there were now district medical officers, with an annual salary, whose duty it would be to inspect cowsheds and the animals contained in them at stated periods; so that if any epidemic should arise through the dissemination of the milk of a diseased animal, his services would be at the disposal of the authorities. His assistance would be of great value to the medical officer in elucidating the cause of the outbreak. Slaughter-houses and meat would also be inspected by him, and there would be those other duties which were now laid upon them as inspectors under the Contagious Diseases (Animals) Act.

On the motion of Mr. HANCOCK, a hearty vote of thanks was accorded to the President for his inaugural address, and the discussion on the address was adjourned.

Firing.

Professor PRITCHARD then delivered a very interesting lecture on "Firing."

The Annual Dinner.

The annual dinner was subsequently held at the hotel, Mr. Awde again presiding. The customary loyal toasts were given from the chair and heartily honoured.

Mr. NETTLETON proposed the toast of "The Army, Navy, and Auxiliary Forces," to which Mr. Peele and Mr. Elphick responded.

Mr. MOORE, of Newcastle, in proposing the toast of the evening, "Success to the South Durham and North Yorkshire Veterinary Medical Association," expressed a hope that as the years rolled on the friendship between them, not only as individuals, but as associations, would grow greater and closer.

The President, in responding, said there was no feeling of antagonism to the North of England Association on the part of those who started the new association, and he was glad to say that there was now a thoroughly friendly feeling between the two. He was pleased to say that their association had been successful, and that the membership had increased year by year.

Mr. STEVENS proposed the health of "The Visitors," for whom Mr. HUNTER, Mr. DUDGEON, and Mr. HILL responded.

Mr. HANCOCK then proposed the toast of "The Press."

SOUTHERN COUNTIES VETERINARY MEDICAL ASSOCIATION.

(*Continued from page* 214.)

If these drains are carried to either a sewer or a cess-pit, there should always be a large open grating over the drain, some few feet from the stable, and under this grating should be a catch-pit, which should be cleaned out once a week. In the event of there being any obstruction in the drain, or from any causes the impure gases are driven back from the sewer or cess-pit, they thus escape into the open air, whereas, if this outlet is not provided, they will come back into the stable, and various diseases of a septic nature are not unlikely to result. I could give you many experiences of this—and when the gratings, as suggested, have been made, the stables have been healthy. All drains should, in addition, be well trapped and ventilated.

In rural situations, where there is plenty of room, the cess-pit should be far away from the stables, and left *open*, it is then exposed to that little considered, and lightly appreciated, army of scavengers provided by an omniscient Creator—I mean the millions upon millions of larvæ of dipterous and coleopterous insects—whose function in nature seems to be the keeping in check of the numbers of these microscopic creatures, bacilli, etc, which in their turn, are the cause of the returning to the elements of those particles of organic matter that have been deprived of life, so that they may again enter this great mysterious cycle.

The walls of the stables should either be painted, so that they may be washed down periodically, or they should be lime-washed all over once or twice a year. Whether the top of the stable is flat, or whether it follows the shape of the "spring" of the roof, it is well to have it *ceiled*, and, whether slated or tiled, there should be either boards or felt between the outer covering and the rafters, this adds much to the comfort of the horses. Open tiles are particularly objectionable in the event of much snow, such as we experienced this spring.

The mangers should be from three feet to three feet three inches high. Iron is always to be preferred, and there should be provision made for corn, hay, and water.

I will not now enter on the question of fittings, they are more ornamental than really useful or necessary.

Only three things suggest themselves to me in this respect:—

There should be provision made for the free circulation and diffusion of air under all box and stall partitions.

All rings for tying and securing horses should be affixed by bolts, either going through the walls and made secure by a small plate on the other side, or fixed very securely by being jagged on the edges.

All door fastenings should be so made as to prevent the possibility of a horse being torn by them, and the springs of the hooks of all pillar-reins and head-reins should be personally inspected periodically.

Such, gentlemen, is a brief outline of my ideal stable.

But in practice I would ask you, is it the *rule*—of course there are many exceptions—but is it the *rule* to find anything approaching what it has been my endeavour to pourtray? Do we not find the stables attached to some of the most elaborate houses built without any thought being given to the health and comfort of the animals that are to occupy them? Nay, how few architects give a thought as to the nature and delicacy of the respiratory and other organs of the horse! and how needful it is that the drainage and ventilation of their stables should be of the best. Or look again at the ordinary run of the tradesman's stable. Do we not often find any out-of-the-way corner—never mind how devoid of light, air, or purity, so long as it does not interfere with the business—selected as good enough to keep a horse in? It is a common thing to find the horses of some first-rate tradesmen kept in the most unhealthy and uncomfortable quarters.

We have much reason for congratulation on the great improvements that have been made during the last few years in the construction of the stables of those gentlemen who take a pride in their horses—still, we must acknowledge, from every-day experience, that much remains to be done in educating the minds of tradesmen, the managers of 'bus stables, and those people who only keep their one or two horses as machines, as to what is necessary for their horses' health and comfort, and let it be our endeavour, whenever opportunity permits, to show them their folly. As medical men have been responsible for the great improvements in the construction of hospitals and dwelling houses, so should it be our province to insist on improvements in the dwellings and hospitals of our patients. One of our greatest drawbacks to the successful treatment of disease, is the foul and vile stables in which our patients are kept—aye, even on farms, and in country places, where space is no object, there is scarcely ever provision made for illness?

Well, though we cannot always have exactly as we could wish, we can, by keeping in mind what we would have as an ideal, suggest alterations that will make some of these places more fit for habitation, and by using our influence at every opportunity, we can so instruct the public mind that more attention may be given to the subject.

One or two such suggestions I will briefly offer for your consideration.

Who of us has not been into some old farm stable, paved probably a century or so ago with pebbles? Some of these are left, but most have disappeared: the floors are the reverse of anything approaching a level surface; the urine stands in pools, and soaks into the ground. Has it been the lot of any of you to see such a floor dug out? I have seen the black, offensive mass of earth under such a floor a couple of feet in depth! How may this be remedied at little expense, and when you cannot have the floor properly paved?

Where chalk is available advise chalk floors. If not, the mother earth is preferable; it may be taken out, and renewed as often as it is getting foul. The earth is one of the best of deodorisers, and such a floor exposes all ex-

crementitious matter to the army of scavengers so lavishly provided by nature, and which, believe me, are exercising a far wider influence in the great economy of life, than is imagined—except by the few who delight in searching after these things.

As ventilators, sheets of perforated zinc of large enough mesh to prevent the holes becoming fouled and obliterated by dust, or small mesh wire netting, let into the panels of doors, taking care to have one in the lower part, and one in the higher.

The stables can be lime-washed occasionally.

After any infectious disease the most thorough cleansing and disinfecting of any stable in which a diseased horse has been standing. This should always be done under personal supervision, to ensure that all corners and crevices are thoroughly cleaned.

The use of disinfectants to the stable floors every morning, and the free application of some disinfectant into all drains once or twice a week.

Try and have light and air let in by some means.

In Fleming's "Veterinary Sanitary Science and Police," there is the following quotation: "The prevention, or prophylaxis of disease must hold the first place in medicine and sanitary science, and its importance cannot be over-estimated; for its object is to render the development of maladies impossible, and to preserve individuals or masses of animals from their invasion."

Gentlemen, both from a sanitary and financial standpoint this question of stabling of horses needs at times to be brought to public notice, and then, sooner or later, we may expect some kind of interference which will add to the comfort, and conduce to the health, of thousands of our dumb slaves, and at the same time will have secured to us one more victory over the forces of the enemy, Disease, with whom we have declared war to the death.

I thank you all very much for your kind indulgence. I only ask you to show your appreciation of my endeavour to interest you by entering at once into a short and useful discussion. I will conclude with a quotation that might be affixed to many stable doors:—

> "A man of kindness to his beast is kind;
> But brutal actions show a brutal mind.
> Remember, He who made thee, also formed the brute,
> Who gave thee speech and reason, also made him mute.
> He can't complain, but God's all-seeing eye
> Observes thy cruelty—He hears his cry.
> He was ordained to be thy slave and drudge;
> But know that his Creator is thy Judge!"

Mr. Goodall, in reading his paper, thoroughly aroused the interest of those present, and at the conclusion a discussion ensued.

Discussion.

Mr. J. T. KING said he felt they must all return Mr. Goodall hearty thanks for his instructive paper. The subject of the construction of stables was one of vast importance to them, not only as preservers of the lives of animals, but also as having the well-being of human nature at stake. The subject, he thought, had been wonderfully well handled by Mr. Goodall. It was too deep to grasp in a short time, and was worthy of a great deal of consideration and thought. There were passages in the paper which he thought they must all agree with, particularly that as to ventilation of the floorings of stables. Mr. Goodall had not touched much upon stable fittings, which was also a subject for consideration. He was referring to fittings where horses were liable to injury by their jaws becoming fixed by the teeth in the iron-work of a manger. He had met with several cases of this sort. One case of this description occurred where the horse's head had to be secured to the

side of the stall, whilst the manger was dislodged with heavy hammers. This was a thing which ought to be stopped; and in many stables which he had visited lately, this defect had been remedied. He had taken the trouble to point out the defect to the manager of the firm who supplied the manger, and he believed they had now remedied it.

Councillor H. W. JENKINS said, as a visitor at the meeting and a builder of stables, he appreciated the paper read by Mr. Goodall very much. He had learned some good points from it.

Alderman NEWLYN said he had to return hearty thanks for the privilege he had enjoyed in being invited to the meeting, and hearing the paper so well prepared and read in so masterly a manner, by Mr. Goodall. No words of his would raise him in the estimation of the profession in which he shone. It had afforded him great pleasure to listen to so good a paper.

Dr. NUNN, having alluded to the privilege and pleasure it gave him to be present, said Mr. Goodall's paper seemed to him to be very *apropos* of the town in which they were then assembled. He thought there was one thing in Bournemouth in which they endeavoured to attain perfection, and that was in sanitary matters. It was therefore very gratifying to find that in a town where the members of the medical profession were doing all in their power to prolong human life, the horse, one of the most noble of creatures, was being cared for. (Applause.) He was quite of the same opinion as the essayist, that it was undesirable that a horse should be placed in a stable and allowed to stand within a few feet of a white solid wall, breathing its own breath over and over again. The colour of the walls of a stable should, he thought, be of a neutral tint, for what was grateful to our own eyes would be grateful to the eyes of a horse. There was another point in the paper which he must thoroughly endorse, and that was with regard to the drainage of stables: that there should be no drains whatever except open drains. The closed drains were constantly blocking up, causing foul air in the stables. Let there be open drains running right through the stable, and be careful to see there was no possibility of anything in the way of drainage returning to the stable. He was particularly favourable to another point, viz., that doors of stables should open outwards. This was a great advantage in case of fire, and it was a lamentable thing to think that fine valuable horses had been roasted to death, being unable to get out of the stable as the doors opened inwards, whereas had they opened to the outside they might have escaped. Then again with reference to the "gully" suggested in the paper, he was of opinion there should be a thoroughly radical change in the construction of stables. The architects of the day had not kept pace with the times. He did not want to be too severe with them, but in the matter of building stables on hygienic principles they were certainly behind. He thought the time had now come for reform. The architects could not plead ignorance, and they ought to realise the necessity of ensuring the sanitary condition of stables. He thought if they read Mr. Goodall's excellent paper they would get some practical hints, and in a short time they would get a model stable in Bournemouth, which they would only hope would be adopted generally. The building of an ideal stable, such as the one Mr. Goodall sketched out in his paper, would be a grand thing, and he (Dr. Nunn) was sure there were sufficient lovers of horses in Bournemouth to give a prize to the first man who constructed a stable on those characteristics. Any thing that could promote the health or well-being of animals was of great interest to him, and he was most happy to be present at the meeting that day. They had all gained some practical knowledge, and should combine and back up Mr. Goodall in his efforts to obtain an ideal stable.

Mr. PACK quite agreed with Mr. Goodall and the previous speaker, that it

was undesirable for horses to be tied up in front of a blank white wall for hours together. In his opinion loose-boxes were far preferable to stalls. He considered that surface drainage was by far the better system to adopt, also as to covering woodwork, especially new wood, with zinc or hoop iron, as he believed horses, especially young horses, often contracted bad habits, such as crib-biting, from gnawing and biting the wood, besides spoiling its appearance. When putting up new stables a short time ago he had neglected the precaution, and the consequence was the mangers soon wanted to be renewed.

Mr. BAKER said he thought the criticism and questioning of papers was very essential for the good of those who heard them. There was one point he should like to ask for information on, and that was in regard to the water trough. Mr. Goodall had suggested and advised what was generally used in stables at the present time, and theoretically he considered he was correct. This was the placing of troughs by the side of the manger. His experience was that they had one considerable drawback. The horse having the water before him could drink at will, and of course knew best when it required drink, but he thought when they were brought to the stable in a sweating condition, and they took a long draught, it was detrimental to their health. Then, again, if they were not thirsty, they kept dipping the nose in and out of the water, and in many cases with dire consequences. Sometimes the water, through neglect, was not fresh, and instead of having it pure they drank it foul and stinking. If they could but get the men to give the horses their water at the proper time, he thought it was a far better system to adopt than having the water continually by them. The matter of gangways in stables would also, he thought, open up a subject worthy of their consideration. The surface drain was undoubtedly the best drain they could possibly adopt, and, with the exception of the matter of the water troughs, he was entirely with Mr. Goodall. He thought they were all greatly indebted to him for the excellent paper he had given them.

Mr. PIESSE differed from the previous speaker. He said he thought that for a horse to take a long draught when it first came in was rather beneficial. He had always allowed his horses to have plenty of water when they came off a journey, and had never once known bad effects to follow. He thought if an animal was given its feed first, and then given its fill of water, it did not have so good an effect.

Mr. BAKER held with Mr. Piesse's last remark, but he thought it was unadvisable to allow a horse its fill of cold water when hot and partially exhausted.

Mr. PIESSE did not think there were recorded many cases on record in which it had done harm.

The PRESIDENT said the best compliment they could pay Mr. Goodall was to discuss his paper, and he felt quite certain any criticism they might pass upon it, he would be only too pleased to hear. He would also be happy to to assist them in the solution of any points. There were few more interesting subjects from an hygienic point of view than the construction of stables. About the last thing that occurred to the builder of stables was that they should be constructed with regard to hygiene. Any out-of-the-way corner seemed to be regarded as good enough in which to build a stable, and it would only be by them, as professional men, furthering the matter from a hygienic point of view that they would, at some future time, see stables built with proper regard to sanitary conditions. With reference to the height of a stable, touched upon by Mr. Goodall, it was very inconvenient if one wanted to sling a horse to find that the stable was only some eight feet high. It seemed to be the result of that pig-headed conservatism in building stables that they found them so low. Then with regard to paving, the two objections

he had to vitrified bricks were: first, the channels forming the squares could only be kept clean by thoroughly washing, the objection to this being done every day would be patent to every one; secondly, their smooth, slippery surface was a continual source of danger. The granite pavement was far preferable from his point of view. It afforded a good, firm foothold, and could be laid down in any pattern required. The drainage question, he thought, had been tolerably well threshed out by those who had previously spoken. There could be no doubt but that any system of underground drainage required to be thoroughly supervised, and put in in a most careful manner, and also periodically examined afterwards, if it is to carry out its purpose. The drain which Mr. Goodall advised was, he understood, an open drain carried out through the stable. There must be some means of lighting stables, and in regard to gas fittings it was very important they should not be within reach of the horse. He once found a horse in a very bad state from inhaling gas—it had been playing with the burner, and turned it on. Speaking of ventilation, Mr. Goodall had undoubtedly hit the right nail on the head in advocating low ventilation. It was a method he had used over and over again with the best results. He recollected on one occasion there was a stable in which Influenza of almost a typhoid character was raging. The ground was saturated with urine of generations of horses. He had a man to knock five or six holes in the wall close to the ground, and the improvement in the air in the stable, after about an hour was surprising. It was impossible to always have an elaborate system of arrangements in a stable, but there were many little improvements they could suggest when they were called in to attend cases. He was pleased to hear the remarks which had been made as to the colouring of the walls of stables. Green encaustic tiles answered the purpose. He had seen plate glass painted green at the back used, but if this was not properly set in the cement it was very liable to get fractured. Mr. Baker had spoken about the conditions under which horses were watered. For his own part he regarded with favour the system of keeping water by the side of horses, and he had not found (if a properly constructed receptacle was used) any danger arise from this plan. He advised for use a basin which tipped up, with a supply tap above, such as had recently been put in a stable constructed under his own supervision. A waste-pipe was attached, and he thought this was an arrangement not likely to be neglected, and, at the same time, a fresh supply of water was ensured. To his mind there was a great deal of needless apprehension with regard to the watering of horses. He thought when horses became accustomed to drinking whenever they chose there was not the least danger in letting them do so. Drinking water when hot was supposed to cause Colic; he ventured to say that of one hundred cases of Colic not twenty could be traced to drinking water. There was, however, always an endeavour to attribute it to the water. Referring again to stables, the Chairman said he trusted the advance of the special knowledge required would result, in the future, in a better class of stable being built. The ordinary architect could, by study and reference to the work of others, arrive at a knowledge of how to build a house, but unless he were a horseman it was a difficult thing for him to know how to build a proper stable. It was for them, the members of the veterinary profession, to teach them, and he certainly thought that Mr. Goodall's paper was a step in the right direction. (Applause.)

Mr. GOODALL, in reply, said he found it impossible to get all he wanted to say in his paper. Such manger-fittings as Mr. King had described were not fit to be put in any stable. The subject of fittings was worthy their attention, and perhaps they might get some member to give them a paper on this subject alone. His idea of having the horses' heads round facing each other was this: (he had adopted this plan during the recent outbreak of Influenza); it

gave the horses plenty of room, and they made a better recovery. He knew of one establishment in London, where it was the custom to always bring the horses' heads round facing each other when not in work. It was a change for them, and they could see what was going on, and it must be better for them. It was his experience that some cases of Colic and slight illnesses were due to foul gas in the stable. Then, with regard to the water-troughs, an excellent plan was to have a tap let into the stable-wall, properly guarded. The groom had always plenty of water to flush the drains and fill the manger, and cleanliness was the secret of a healthy stable. Respecting the paving of stables, he thought granite preferable to vitrified bricks.

Election of Secretary.

The election of a Secretary, postponed from the last meeting, was the next business on the agenda.

Mr. HOLLINGHAM proposed that Mr. Pack be elected to the office of Secretary to the Association. It was a duty of which he (the Chairman) had had some six or seven years' experience, and he could assure Mr. Pack the duties of the office were not heavy, and they were considerably lessened by the assistance rendered by the active and sympathetic members.

Mr. PIESSE seconded.

Mr. PACK said that since the matter had been mentioned to him he had given it consideration, and he had come to the conclusion that, situated as he was, at the extreme end of the limits of the Association, it would be very inconvenient to him to attend all their meetings, and suggested that some member be asked to accept the office who was more centrally situated. The work connected with the office would, he felt sure, be a very secondary consideration to any one.

Mr. PIESSE having promised to attend any meeting when Mr. Pack was unable to do so, and act as Secretary for that day, the latter consented to accept office, and was elected accordingly.

The CHAIRMAN said it afforded him very great pleasure to propose a very hearty vote of thanks to Mr. Goodall for his excellent paper. To prepare such a paper took up a considerable amount of time, and they would not find a member prepare a paper unless he was in love with his Association, and everything connected with it. He always regarded it as a matter for congratulation, and thought it was a healthy sign when an Association was able, as they had been, to get some gentleman to prepare a paper for each meeting. (Hear, hear.)

Mr. PACK seconded, and the proposition was carried unanimously.

Mr. GOODALL, in acknowledging the vote of thanks, said he regretted that there were so few members present to listen to his paper, as the subject was one worthy of great consideration, and they should do all in their power to secure a better class of stable being built in future.

A vote of thanks to the Chairman for presiding having been passed, the meeting then terminated.

C. PACK, *Hon. Sec.*

LANCASHIRE VETERINARY MEDICAL ASSOCIATION.

THE quarterly meeting was held at the Blackfriars Hotel, Manchester, on the 8th of July. *Present:*—Mr. Arthur Leather (President). Messrs. Greaves, P. and W. Augustus Taylor, Faulkner, Locke, Hopkin, Wolstenholme, Dacre, and Lloyd-Jones, all of Manchester; Edwards, Chester; Whittle, Worsley; Carter, Burnley; Thompson, Sheffield; Munro, Altrincham; Gubbins, Glossop; Hall, Royton; Briggs, Bury; Hart, Oldham; Noar, Bury; Woods,

Wigan; and Gartside Mayor (Secretary), Kirkham. As visitors, Messrs. Carter, of Bradford, and Moore A.V.D., and Messrs. Bidlake, Kitsell, F. W. Hall and E. H. Stent (Students).

Mr. THOS. BRIGGS nominated for membership Mr. Harry Hall, of Liverpool Road, Manchester; and Mr. Munro, nominated Mr. E. P. Edwards, of Mold, North Wales.

International Congress of Hygiene.

The SECRETARY read a letter from the Secretary of the International Congress of Hygiene and Demography, and it was resolved that a sum of five pounds be voted from the funds, and that the President and Treasurer be appointed to represent the Association at the Congress, the Secretary having expressed his inability to attend.

Mr. W. A. TAYLOR then brought forward the question of employing a shorthand reporter at the ordinary meetings, and it was unanimously resolved that a reporter be engaged to act for one year.

Mr. LOCKE gave notice that at next meeting he would bring forward a motion that some other *rendezvous* be selected.

Mr. THOS GREAVES brought before the notice of the members the question of the Steel Memorial, and the Treasurer having expressed his willingness to receive and forward subscriptions, a number of those present made donations to the fund, while it was clearly understood that others had subscribed privately.

The SECRETARY gave notice that at the next meeting he would move that the meetings be held at an earlier hour, so as to offer more inducement to country practitioners to join.

Morbid Specimen.

Mr. W. AUGUSTUS TAYLOR brought under the notice of the meeting a specimen of Renal Calculus taken from a Clumber Spaniel bitch which had been under his care. The animal in question had died from Septic Peritonitis (post-partum), and on *post-mortem* examination a calculus about $\frac{3}{4}$ in. in length by $\frac{1}{2}$ in. in diameter was found impacted in the pelvis of one kidney.

Mr. DACRE referred to a case in his practice when he had diagnosed the presence of Renal Calculus in a dog, but as the animal recovered there was no opportunity of confirming or refuting the diagnosis.

Mr. DACRE also exhibited a number of Vesical Calculi from a dog.

Mr. WOLSTENHOLME referred to a case lately occurring in his practice when he had successfully removed a large urethral calculus from a horse.

Mr. PETER TAYLOR then brought forward for discussion the question, "Ought firing and blistering to be discontinued in veterinary practice?"

Mr. TAYLOR, in his usual energetic style, stood forth as the warmest possible advocate of counter-irritation in almost every shape and form, citing numerous clinical instances in support of his position.

In the remarks which followed, the usual differences of opinion as to the use of counter-irritants in diseases of the respiratory organs were expressed; while the opinion that in many joint diseases they were indispensable was apparently unanimously held, and the practical, though somewhat inexplicable, advantages of "firing" over other irritants was strongly dwelt upon.

Messrs. Greaves, Thompson, Whittle, Moore and others joined in an interesting discussion, which was prolonged till a late hour.

Cordial votes of thanks to chairman, introducer of discussion, and exhibitors of specimens, brought a most harmonious meeting to a close.

G. GARTSIDE MAYOR, *Hon. Sec.*

NORTH OF ENGLAND VETERINARY MEDICAL ASSOCIATION.

THE usual quarterly meeting of the above Association was held on the 21st August, at the County Hotel, Newcastle-on-Tyne. The President, A. Hunter, Esq., in the chair. The members present were Messrs. C. T. Hunting, C. Stephenson, J. Aitken, F. Finney, J. W. S. Moore, W. Hunter, J. Brodie, Nisbet, H. Hunter, W. Ashton Hancock, D. Dudgeon; and Messrs. Johnston, Ashby and Currie, visitors.

Mr. J. R. Crone was nominated as member of the Association.

Mr. HUNTER read the following paper on the

"CRUELTY TO ANIMALS ACT," AND A FEW NOTES ON ITS ADMINISTRATION.

Mr. PRESIDENT AND GENTLEMEN,—In bringing before your notice the subject of the Prevention of Cruelty to Animals Act and its administration, I may say that I am quite in sympathy with the Act itself, and I am sure that our profession generally are anxious and willing to assist the R.S.P.C.A. in forwarding the objects they have in view, so far as they can consistently with their opinions as to what really constitutes cruelty within the meaning of the Act.

The following is the section of the Act under which proceedings are usually taken: "That if any person shall, from and after the passing of this Act, cruelly beat, illtreat, overdrive, abuse or torture, or cause to be cruelly beaten, ill-treated, over-driven, abused or tortured any animal, every such offender shall for every such offence forfeit and pay a penalty not exceeding £5."

I will now proceed to notice what I consider some of the anomalies and inconsistencies in the administration of the Act, in reference more especially to horses.

As a rule, magistrates refuse to give costs against the Society, although they may have been proved to be entirely wrong, and to have brought forward a case without the slightest reason. The case is dismissed, the defendant has to suffer the indignity of being dragged to the police court on a charge of this kind, and to pay his own costs, besides the loss of time of himself and possibly his horse. Is this justice or equity? Veterinary surgeons are often consulted as to alleged acts of cruelty where the animal has been stopped working by the Inspector, and although in their opinion it is no cruelty, they often advise them, if poor people, not to defend the case, as it is cheaper to be fined than defend it. Is this right, and should a powerful society, however good its objects, be allowed to inflict such a wrong and injustice on poor people? If costs were given against the Society when they failed to prove their case it would tend to temper the zeal of the Inspectors with reasonable discretion.

Many cases of a very trivial character are brought to the Court, and the evidence given in support of the charge is very often exaggerated to a great extent.

The time which is allowed to elapse after the alleged offence is said to have been committed and the issue of the summons prevents steps being taken to get evidence to rebut the charge, as they are left in doubt as to whether they will be summoned or not; in fact, they are often under the impression that they will not be summoned.

If an inspector, in connection with any case which he considers cruelty, is referred to a veterinary surgeon, I think it ought to be imperative upon him to consult such veterinary surgeon, and to hear his explanation before taking any further steps. Due weight is not given to the fact that some lamenesses do arise very suddenly, may have occurred after the animal left the stable, are only temporary in their nature, and are quickly relieved.

It is well known that many animals are very tender in the skin, and in

spite of all the care and attention you can give them it is difficult to prevent abrasions occurring. When it is found that every effort is being made to prevent this by easing the harness, by false collars, zinc pads, etc., due consideration should be given to these efforts, for it is evident that there is no intention to be cruel, but quite the reverse.

There are many cases of slight lameness from various causes, such as bent legs, shortened tendons, anchylosed and stiff joints, grease, etc., in which the animals suffer little or no pain and are perfectly fit to work; yet such cases are frequently taken to the police court and the owners fined.

In some cases of lameness, exercise or light work are essential to recovery; such are Lymphangitis, Laminitis, and cases of adhesions.

Veterinary surgeons are frequently asked in the witness-box whether they will swear that the animal is suffering no pain. This I consider an unfair question, for it is not a question of absolute freedom from pain, but, rather, does the pain the animal suffers amount to cruelty? If the former was to be the definition, then fully one-third to one-half the animals in the county might be stopped to-morrow.

The action of the Society is becoming so oppressive that many horse proprietors are seriously thinking of combining to protect themselves.

Is it wise from the Society's own point of view to alienate the sympathies of the public by any injudicious and oppressive action on their part? I feel quite sure many members would cease to subscribe if they thought that injustice and hardship were inflicted on poor people with out any sufficient reason.

I am afraid that many cases are not fairly stated to the Society by the inspectors, or they would never sanction the prosecution of such trivial and unsuitable cases as are frequently brought forward.

Discussion.

Mr. C. S. HUNTING said that he had listened with interest to Mr. HUNTER'S paper, and, although his experience of cruelty cases was somewhat limited, he thought, in many instances, the course pursued by the officers of the Society for the Prevention of Cruelty to Animals was very oppressive; and there appeared to him to be too great a desire to obtain convictions, especially among the poor people. He instanced a case showing the extent the officers will go to in the way of exaggeration so as to gain their case.

Mr. W. HUNTER mentioned that formerly he was in the habit of attending to give evidence on behalf of the Society, but he gave it up about two years ago, as it occupied so much of his time, and interfered with other work. For his part he thought the officers of the Society were well chosen, and felt they should not be spoken too harshly of, as they had very difficult work to perform; but he certainly thought the police were in the habit of getting up very poor cases; in fact, cases came into court that never should have been thought of.

The PRESIDENT next made a few remarks, and related several cases which tended to show that the Society were far too ready to prosecute the poor horse-owner and let the well-to-do owner go without interference, although, probably, the latter may have been the greater offender of the two.

Mr. STEPHENSON said he hoped it would not go abroad that this profession did not desire to support the Society, but he must certainly state his conviction that the officers were, in many instances, very much to blame. His experience was that many so-called acts of cruelty were the result of thoughtlessness rather than from any desire on the part of the owner to inflict pain. He felt that the Society would do more permanent good if they would strive to educate the poor to be kind, instead of prosecuting them for every trivial case that occurred.

Mr. MOORE claimed that this profession was the best friend of the Society, and he endorsed all that had been said by Mr. Stephenson. He also thought that the magistrates took it for granted that the evidence of the Inspector must be right, and mentioned a case that after the evidence of the Inspector and veterinary surgeon, was dismissed, and it really turned out to be a personal matter; in fact, the Inspector was heard to remark subsequently, that had the defendant kept a civil tongue in his head he would never have been prosecuted.

Mr. CURRIE said he had on one or two occasions had horses stopped by the police for most trifling things, such as small wounds on the wither where no harness could possibly come into contact with it.

Mr. D. DUDGEON thought that the Society had done a great deal of good, but not an unmixed good, it was to his mind governed by far too much sentimentality. He had known of cases in which the officers had been trying to get cases up against veterinary surgeons for having expressed an opinion that horses could be worked. The question of costs was also a very great hardship, and seeing that defendants (even if the Society failed to prove their case) could never get costs, it was far wiser to advise them to go to court and be fined than to go to the cost of defending the case.

A unanimous vote of thanks was accorded Mr. Hunter for his paper.

W. ASHTON HANCOCK, *Secretary.*

THE MIDLAND COUNTIES VETERINARY MEDICAL ASSOCIATION.

A MEETING was held at the Star and Garter Hotel, Wolverhampton, on August 7th, 1891. The President, Mr. Malcolm, occupied the chair. There were also present Professor McFadyean, Messrs. Beddard, Pritchard, R. Cartwright, J. E. Cartwright, Wolverhampton; Blakeway and Gibson, Birmingham; Wartnaby, Burton-on-Trent; Trigger, Newcastle-under-Lyme; Chambers Dudley; Collett, Dawes, and Dr. Manley, West Bromwich; Horten, Warwick; Russell, Grantham; Merrick, Northampton; Pemberton, Bridgwater; Paley, Walsall. Visitors, Messrs. Kidd, Burton, Bakewell, Beddard, Watson, Cuerton, and Welsh.

The Hon. Secretary read letters of apology from Professors Pritchard, Walley and Williams; Sir H. Simpson, Messrs. Greaves, Olver, F. Blakeway, Over, and others.

On the motion of the PRESIDENT, seconded by Mr. MERRICK, Mr. F. B. Barling, of Monmouth, was elected a member. On the motion of Mr. TRIGGER, seconded by Mr. SMITH, Mr. Coe, of Stoke-on-Trent, was elected a member. Mr. WARTNABY proposed and Mr. DAWES seconded, the nomination of Mr. Michael Sadler, of Burton-on-Trent.

Professor MCFADYEAN then gave a lecture

"ON SUPPURATION,"

of which the following is an abstract:—Suppuration, he said, was a morbid process characterised by the formation of pus. This pus when examined microscopically was found to be composed of a liquid and suspended cells—the pus corpuscles, and suppuration appeared to be a variety of exudative inflammation in which the inflammatory exudate remained liquid, and even the solid textures of the inflamed ones underwent liquefaction. So far the nature of suppuration and the minute structure of pus had been known for a long time, but until a comparatively recent date what was in one sense the most important element in pus had been overlooked. About ten years ago Ogston of Aberdeen showed that when pus from an acute abscess was properly examined it was possible to make out in it numbers of minute spherical organisms, which, from their being generally grouped together like a bunch

of grapes, he termed staphylococci. The apparently constant presence of these organisms in pus was strong presumptive evidence in favour of their being casually related to suppuration, and Rosenbach, Passet, and others, taking up the investigation, succeeded in isolating and cultivating in a state of purity a number of different organisms found in pus. The commonest of these was the staphylococcus amens, which from its manner of growth in different culture media was an easily recognised organism. This organism had the power of liquefying gelatine and even of digesting coagulated albumen, apparently in virtue of some peptonising substance liberated by it. In holding the micrococci formed in pus over the actual cause of suppuration they had not to rely solely on the constant presence of those in pus, for experiments on animals, and more conclusively still on man, had shown that with pure culture of the staphylococcus amens they could set up suppuration at will. Garcé, Bochardt, and Bumm had thus been able to produce the most typical abscesses, boils, and carbuncles, and the final step in the proof was thus led. Against the view that these micro-organisms was the cause of suppuration it had been urged by Grawitz and others that it was possible to set up suppuration by germ-free substances, but while it had, perhaps, to be admitted that this was experimentally possible, the facts appeared to justify the conclusion that suppuration occurring naturally was always associated with the presence of micro-organisms, and that organisms were as truly the cause of suppuration as the anthrax bacillus were the cause of Anthrax—in short that without micro-organisms there was no suppuration. While suppuration was thus as truly microparasitic in its nature as Anthrax, it was not a specific affection like the latter, for they were already acquainted with quite a number of different organisms that had been known to have pyrogenic properties for one or more species of animal. As illustrations, he referred to the streptococcus of Strangles, and the discomyces found in Scirrhous cord. All the necessary evidence has been produced to show that Strangles was caused by a minute organism—a streptococcus—which was invariably to be found in the pus formed in that disease, and in like manner it had been proved that the so-called Scirrhous cord resulted from the presence of the discomyces or micrococcus as formans.

Discussion.

The CHAIRMAN said the able lecture which they had from Professor McFadyean opened up a wide field for discussion. The explanations of the causes of suppuration in acute Strangles, Scirrhous cord, and in Tumour were of much interest, and worthy of great consideration, and he hoped the members would enter into and fully discuss these matters.

Mr. TRIGGER agreed with the Chairman that the explanation of suppuration in the formation of pus, as given by the lecturer, was of very great interest and worthy of serious study, but to him it was a question of considerable difficulty. Of course, he should accept the conclusions which the Professor had arrived at, as he had not the temerity to question those of one of the most eminent pathologists of the day. It was only when they came to the practical part of the subject he could express his opinions. In his experience, the chief way to prevent pyæmic diseases was simply by securing absolute cleanliness in operation, such as castration; it was necessary not only that the instruments were perfectly clean, but that the hands of the operator be also clean before operating. He cited a case which had come under his own observation, in which a gentleman lost a number of lambs after castration. The operation had been performed by the shepherd with a knife which he used to pare the feet of sheep suffering from "Foot-rot," and had not been subsequently cleaned. That this was the cause was proved by the shepherd having castrated two lots of lambs on the same day. In the one

lot there was one fatality, he having used a clean knife to perform the operation, but in the other many of the lambs died. Another curious case was one brought to him for treatment; at the end of the tail there was a large tumour (so-called turnip tail) which, when amputated, weighed about two pounds. It seemed to consist chiefly of fibrous tissue, in which there was one or two suppurating centres. The pony had been previously docked by a blacksmith, who being unable to arrest the bleeding, had applied a ligature to the end of the tail and left it on for a considerable time; it was his (Mr. Trigger's) opinion that this was the cause of the formation of the Tumour. He docked the pony, and allowed it to bleed as long as it would, and he was pleased to say that the result was satisfactory. He forwarded the Tumour to Professor McFadyean.

Mr. MERRICK said he had listened with very great pleasure to Professor McFadyean's lecture. It clearly proved what immense value microscopical research was to veterinary science, and the pupils at the colleges at the present day had opportunities for study which were not available in his day. He should not venture any remarks on the highly scientific address given, but would content himself with a few practical observations. With regard to Strangles, he thought that disease was a good deal attributable to young horses being brought up from the country, and confined in close stables, where the atmosphere and drainage was bad. He had known two or three cases of this description, where colts had commenced with Strangles, and had afterwards been attacked with mesenteric abscesses in the liver and glands.

Mr. WARTNABY, remarking on the vast strides which have been made in bacteriological research, said that with regard to the tumours of the shoulder which Professor McFadyean had referred to, he had seen them disappear in a very remarkable way, after being punctured in several places with an exploring needle. In his opinion, these were more Schirrous cords following the use of the ecraseur than the actual cautery. He also thought that the surroundings at farm houses, as a rule, were not what could be desired for the patient after castration. He would like to know if Professor McFadyean advocated antiseptic dressings after the operation.

Mr. HORTEN, after thanking Professor McFadyean for his very interesting address, said he would like Professor McFadyean, in his reply to the general remarks, to give them his views as to how the germs, which he had just told them were the constant cause of suppuration, got into the tissues sufficiently deep to cause poll-evil and abscess on the withers, etc.; he could quite easily see how they could get into a wound like the one made in castration, and then set up the suppurative process; but he would like to hear the theory put forward to account for their gaining admission when there was hardly an abrasion.

Mr. BLAKEWAY asked Professor McFadyean if he could give an explanation of the relation of Strangles to Influenza, if there was any, or if they were two distinct diseases.

The PRESIDENT, before calling upon Professor McFadyean to reply, said he should like to join with the previous speakers in expressing his indebtedness for the remarkably learned and able address they had heard. In explaining the part that organisms play in the production of suppuration he had made them very sensible of the absolute necessity for cleanliness, and for the proper use of antiseptics in the treatment of wounds, if we wish to gain the best attainable results. He had shown them that without organisms no suppuration takes place, and consequently by their exclusion, wounds may be treated without the formation of pus. In some cases that came before them, this was a matter of the very greatest importance. The other day he saw, with Mr. Dawes, a case in point, which it might not be amiss to mention. A

cart horse with suppuration of the foot, from an injury, had made a fair recovery; but after being at work a fortnight or so, he had to be laid off again on account of the formation of a quittor at the outside quarter of the coronet. On probing this, it was found to extend downwards inside the lateral cartilages, and they all knew how difficult some of those cases were to handle. The question was, could we effect a cure without making a depending orifice? It was a good case for testing the efficacy of antiseptics, and he must say the result was most gratifying. They syringed out the sinus with a solution of corrosive sublimate, and then plugged the orifice with tow antisepticised with the same agent. This was repeated every other day for a week, with the result that suppuration was entirely stopped. A sharp blister was then applied to the coronet, and the case made a capital recovery. With reference to Professor McFadyean's remarks on Scirrhous cord, they would all remember that Professor Pritchard, in speaking of this disease sometime ago at Stafford, stated that he believed Scirrhous always followed a sinus; but Professor McFadyean goes a step further, and practically tells us the sinus is caused by the organisms of suppuration. This being so, it is clear that Scirrhous following castration ought to be preventable. Coming to the question of Strangles, he was somewhat surprised that speakers had not gone into the question of its contagious character. In large studs, when the disease is introduced, and especially if it is of a malignant type, this becomes a question of much importance. Personally, he had not a shadow of a doubt about it being contagious. They had only to introduce it into a stable, to find that nearly all the young horses previously free from the disease become affected. Two well marked extensive outbreaks of this kind had come under his own notice, and he had already put them on record in Professor McFadyean's journal. He now invariably treated every case of Strangles as an infectious disease.

Discomyces.

Professor McFADYEAN, in replying, said that he was not prepared to say that the discomyces was the only cause of Scirrhous cord; but he thought that none of the commonly credited causes—such as leaving the cord long, or the formation of adhesions between the cord and the scrotal wound—were of themselves capable of setting up the condition. He was unable to say what could have been the nature of the periodic enlargement of the cord referred to by Mr. Trigger. Scirrhous cord was frequently found in horses many years after castration, but he did not consider that incompatible with the view that infection takes place at the time of the operation, or before the wound was healed. He believed that all forms of scrotal suppuration, whether occurring in the spermatic cord or elsewhere, were caused by micro-organisms, and said that recent investigations regarding tetanus made it doubly necessary that they should strive after an aseptic healing of all wounds.

The so-called *brustbeule*, or shoulder tumour, was undoubtedly caused by the discomyces, which was propably rubbed into the skin by the collar. Fistulous withers probably had the same mode of infection, but perhaps, previous bruising favoured or was necessary for infection. The shoulder tumours were very difficult to treat, and sometimes nothing short of removal with the knife would succeed.

Strangles, he thought, never arose spontaneously. It was caused by the streptococcus of that disease, which was inspired with the air and penetrated the nasal mucous membrane. The infection might be direct or by means of contaminated litter, wood-work, etc. There was no connection between Influenza and Strangles, save perhaps, that an attack of the one might predispose to infection with the other. Cold alone would not cause Strangles, but he thought it quite possible that warmth, as recommended by Mr. Smith, if

combined with good ventilation, exerted a favourable influence on the course of the disease.

A vote of thanks to Professor McFadyean was heartily adopted. It was decided to hold the next meeting at Burton-on-Trent.

The members afterwards dined together, and a very pleasant evening was spent. H. J. DAWES, *Hon. Sec.*

ROYAL AGRICULTURAL SOCIETY.

AT the monthly Council Meeting held on July 29th, Sir JOHN THOROLD presented the following report from Professor Brown:—

Pleuro-pneumonia.—During the ten months from September 1st, 1890, when the Pleuro-pneumonia Act came into operation, to the end of June, 1891, 240 outbreaks of this disease were dealt with by the Board of Agriculture; 11,452 cattle were slaughtered, of which 1,036 were found affected with the disease.

In the corresponding period of 1889-90 there were 291 fresh outbreaks: 6,891 cattle were slaughtered by the local authorities, of which 1,493 were said to have been affected with the disease.

In the three weeks ending July 18th there were twenty-four fresh outbreaks reported; 807 cattle were slaughtered by order of the Board of Agriculture, of which forty-five were diseased.

The recent increase in the amount of Pleuro-pneumonia is chiefly, if not entirely, due to infected or diseased cattle sold by a dealer in Southampton, and distributed all over England. The Board of Agriculture have traced and slaughtered over 150 cattle sold by this man since the beginning of the year, with the result that Pleuro-pneumonia has been found among them on no less than thirteen different premises.

Anthrax.—During the four weeks ended July 18th there were twenty-one fresh outbreaks of Anthrax in Great Britain, in the counties of Devon, Essex, Kent, Lancaster, Leicester, Lincoln, Salop, Somerset, Suffolk, Sussex, and York (West Riding), in England; and Aberdeen and Dumfries, in Scotland. Of twenty-eight animals attacked, one was killed and the remainder died.

Swine Fever.—This disease still continues to be very prevalent in many parts of England; there were 633 fresh outbreaks in the four weeks, and 3,615 pigs were attacked, 1,813 diseased pigs were killed, 1,332 died, 377 recovered, and 767 remained alive when the last published weekly return was made up.

A letter, dated July 14th, had been read from the Governors of the Royal Veterinary College, stating, in reply to the Society's communication of May 7th last, that on notice being sent to the College of any outbreak of abortion in cattle a special investigation would at once be undertaken, and suggesting that the members of the Royal Agricultural Society should be invited to notify the Principal of the college of any outbreak of the disease occurring among their cattle, so that he may immediately be able to institute an inquiry. The Committee desired to direct the attention of members of the Council and of members of the Society to this communication, and to point out that the cost of any investigation which may be undertaken will be borne by the College. A letter was read from Mr. Walter Gilbey, tendering his resignation as one of the Society's six representatives upon the General Registration Committee of the Worshipful Company of Farriers, in consequence of the pressure of other engagements. The Committee recommended that Mr. Gilbey's resignation be accepted with regret. At the request of the Committee, Sir Nigel Kingscote had undertaken to act as one of the Society's representatives upon the Registration Committee, in succession to Mr. Gilbey.

The Committee were of opinion that a horse-shoeing competition should be

held in connection with the Warwick Meeting of 1892, limited to shoeing smiths in District F, consisting of the counties of Gloucester, Hereford, Monmouth, Salop, Stafford, Warwick, Worcester, and of South Wales. The Secretary having reported that the issue was exhausted of Professor Brown's pamphlet on the Structure of the Horse's Foot and the Principles of Shoeing, the Committee recommended that it should be reprinted after revision by the author.

NATIONAL VETERINARY BENEVOLENT AND MUTUAL DEFENCE SOCIETY.

THE fourteenth General and first Annual Meeting of the above Society was held at the Blackfriars Hotel, Manchester, on September 9th, Peter Taylor, Esq., the President, in the chair.

Present: Professor Williams, Thos. Greaves, W. Whittle, W. A. Taylor, Sam Locke, R. C. Triggar, J. B. Wolstenholme, E. Faulkner, J. Hopkin, and R. Reynolds.

Letter of apology for non-attendance was received from Mr. John Lawson.

A short address was then delivered by the President, reviewing the business that had been transacted during the past year.

The Treasurer reported that the Benevolent Fund amounted to date as follows:—

	£	s.	d.
Cash invested in Mersey Dock and Harbour Board, July 2nd, 1880	1,300	0	0
At £4 per cent. redeemable July 1st, 1900, £50 14s.			
Cash invested in Mersey Dock and Harbour Board, March 6th, 1883	600	0	0
At £3 17s. 6d. per cent. redeemable March 27th, 1898, £22 13s. 4d.			
Cash invested in Manchester Corporation, October 3rd, 1890	900	0	0
At £3 per cent. redeemable September 29th, 1900, £26 12s. 2d.			
Cash in Bank to date	122	15	0
Gross Annual Income, £100 13s. 5d.			
	£2,922	15	0
The funds at the disposal of the Defence Section being	£177	17	8

The draft rules were, after one or two minor alterations, approved, and they were ordered to be printed and circulated amongst the members.

The SECRETARY read the Report and resignation of Mr. George Morgan, as Hon. Secretary, containing a few suggestions for the advancement of the Society.

The resignation of Mr. Morgan was most feelingly alluded to by the PRESIDENT, who suggested that our appreciation of his services be conveyed to him in a tangible form. This was supported by all the members present, and a small Committee was elected to carry out same, viz., Messrs. P. Taylor, Thos. Greaves, and Sam Locke.

Mr GREAVES moved, and Mr. WHITTLE seconded, that Mr. Morgan's resignation be accepted, and his letter be embodied in the Report in full—carried—which is as follows:

"Liverpool, *Sept. 8th*, 1891.

"DEAR MR. PRESIDENT,—As you are well aware I have for some years been anxious to retire from the position of Secretary to the National

Veterinary Benevolent and Mutual Defence Society, but on each occasion I have been over-persuaded to retain the office, although I have all along felt that it ought to be in the hands of a younger and more energetic member of the profession; and having now completed twenty-six years' service, must ask the members to relieve me from further duties. Before, however, doing so, may I be allowed to say that although the Society has not fully realised my earlier anticipations, yet it has done a deal of good, honest work, of which none of the officers need be ashamed; and at present possesses every symptom of healthy vigour and signs of increasing strength, while the Council shows evidence of more matured judgment and ripened experience.

"As institutions go it may be said to have been a strong child from its birth; periods of cloud and sunshine it has certainly had, and the apathy of the profession has at times caused the officers a certain amount of despondency, and critics have at times been busy pointing to the little interest taken in it as signs of weakness and symptoms of decay; but the Society has trudged on its way unheeding those, has survived all the storms, and is to-day better able to fight the honest battles of honest members than it has ever been, and might be made more useful still by an extension of its scope; in fact making it what its name implies, a National Veterinary Association and not what the tendency of late has been, to make it a Lancashire party.

"When it was established there were only about three Veterinary Societies, and each of these had a fair representation on the Council; now there are about twenty, and I think each of these should be represented on the Council, the representative, acting with the officer of his own Society, would act as an investigating committee for their districts and dispose of any trifling case that might arise, and relieve the General Council of both trouble and expense; some scheme of this sort would, in my opinion, popularise the Society and increase its usefulness. Another suggestion I would like to make in reference to the Benevolent Branch, and it is that the Council should be empowered to make grant of money, supplementing the free studentship, so kindly placed at their disposal by Professor Williams, to purchase books for the prosecution of his studies by the holder of that studentship, and that they should use their influence with the Royal College of Veterinary Surgeons to remit the examination fees, in all these cases, or pay them from the funds of the Society, and remove them from the shoulders of the widowed mother. The Council have had two meetings during the last year, and one very important case, that of Mr. Ferguson of Leeds. The Council instructed me to write Mr. Ferguson stating their dissatisfaction, but I have received no reply.

"Several new members have joined since last meeting.

"I now beg to retire from the post of Secretary, and thank each and all of you for your kindness and forbearance.—Yours faithfully,

"GEORGE MORGAN."

The following officers were then elected:—

President—Peter Taylor, Esq., F.R.C.V.S. ..... Manchester.
Vice-President—George Morgan, Esq., F.R.C.V.S. ..... Liverpool.
Treasurer—Thomas Greaves, F.R.C.V.S. ..... Manchester.
Secretary—Samuel Locke, M.R.C.V.S. ..... Manchester.
Trustees—R. Reynolds, Esq., J. Lawson, Esq., T. Hopkin, Esq., and W. Whittle, Esq.

Council.

Thomas Briggs, Esq., F.R.C.V.S. ..... Bury.
J. S. Carter, Esq., F.R.C.V.S. ..... Bradford.
T. Hopkin, Esq., F.R.C.V.S. ..... Manchester.
F. W. Wragg, Esq., F.R.C.V.S. ..... London.

John Lawson, Esq., M.R.C.V.S. .....Manchester.
R. Reynolds, Esq., M.R.C.V.S. .....Liverpool.
W. A. Taylor, Esq., F.R.C.V.S. .....Manchester.
R. C. Triggar, Esq., F.R.C.V.S. .....Newcastle-on-Tyne.
E. Faulkner, Esq., M.R.C.V.S. .....Manchester.
W. Whittle, Esq., F.R.C.V.S. .....Worsley.
Professor Williams, F.R.C.V.S. .....Edinburgh.
Henry Thompson, Esq., M.R.C.V.S. .....Aspatria.

Auditors.

J. B. Wolstenholme, Esq., M.R.C.V.S. | J. W. Ingram, Esq., M.R.C.V.S.

It was resolved that a trust deed be executed in due form.
The meeting terminated with a cordial vote of thanks to the Chairman.

Army Veterinary Department.

Gazette, August 21st.

ARTILLERY VOLUNTEERS.—1st North Riding of Yorkshire (Western Division, Royal Artillery). W. E. Lawrence, Gent., to be Veterinary Surgeon.

Gazette, September 1st.

Veterinary Surgeon Alexander Henry Waddell resigns his commission. Charles Rose, Gent., to be Veterinary Surgeon (ranking as Lieutenant), vice A. H. Waddell.

Veterinary Surgeon A. J. Haslam has embarked for India. While stationed at home he has obtained the degree of Bachelor of Medicine (M.B.) and Master in Surgery (C.M.) of Edinburgh University; also the Fellowship of the Royal College of Veterinary Surgeons (F.R.C.V.S.).

Sir William Lockhart has brought the services of Veterinary Surgeon, First Class, Crowe to notice in a supplementary despatch on the Miranzi Expedition, which his excellency the Commander-in-Chief in India endorses favourably.

Obituary.

THE following deaths of members of the profession are reported :—

C. Middlehurst, Liverpool,	who graduated in	..	..	1872
J. McDougall, Helensburgh	"	..	..	1867
J. Howell, F.R.C.V.S., Rochdale,	who graduated in	..	..	1839
R. W. Thomas, Great Malvern	"	"	..	1854
T. J. Proctor, Liverpool	"	"	..	1843
W. S. Bontoft, Spalding	"	"	..	1875

We hear from Australia of the demise of R. Gibton, M.R.C.V.S., LL.D., of Warnambool. He graduated in 1849, and soon after went to Australia, where—according to the *Australasian Veterinary Journal*—evidently disgusted with the slight appreciation accorded to veterinary surgeons in those days, he decided to give up any idea of practising his profession, and ultimately obtained the appointment of Clerk of the Law Courts at Warnambool, which he held for more than twenty years. On retiring from this position, he commenced practising as a barrister—having qualified himself for that function, and continued until his health gave way, when—on June 29th—he died. The above journal adds: "That a man of such high educa-

tional attainments as Mr. Gibton should find it necessary to adopt some other avocation has, without doubt, been a serious loss to the profession, and it has always been a matter of regret to his professional brethren that he did not obtain the position he sought in the early days, and settle in the metropolis (Melbourne)."

Notes and News.

RABIES IN NORTHAMPTONSHIRE.—At a meeting of the Executive Committee of the County Council of Northamptonshire, Earl Spencer in the chair, it was decided to issue muzzling orders for nineteen parishes. This course was rendered necessary owing to the ravages of a mad dog, which had before it was killed bitten twelve other animals, including two valuable fox-hounds belonging to the Pytchley Hunt.

MERCURY IN HUMAN GLANDERS.—Dr. Mikhail K. Kondorsky, of Kakhovka, Crimea, reports (*Vratch*, No. 31, 1891, p 714) a case of acute glanders successfully treated by mercurial inunctions (as recommended by Dr. I. V. Gold, see *St Louis Medical and Surgical Journal*, July, 1889, p. 55, and June, 1891, p. 366). The patient, a peasant, aged 29, was admitted to the author's infirmary on the 15th day after the onset of symptoms, which consisted in high fever, extreme emaciation, gnawing pains about the legs, typical ulcers (see Supplement, May 9th, 1891, p. 146, art. 406) on the left thigh, multiple abscesses on the upper and lower limbs, etc. The diagnosis of glanders was confirmed by a bacteriological examination of pus from the abscesses, as well as by inoculation experiments on Siberian marmots. The abscesses were at once opened and washed out with a 1 to 500 solution of corrosive sublimate; the ulcers were also irrigated with the lotion, painted with nitric acid, and dressed with sublimate gauze and tow. The essential measure, however, consisted in daily inunctions of grey mercurial ointment, in the dose of from 1 to 2½ drachms. In the course of sixty-five days the patient thus received 1 lb. 1 oz. and 3 drachms of the ointment. On the seventy-second day he was discharged practically well, presenting nothing abnormal beyond a slight elevation of the temperature (37.8° C.). Of toxic symptoms only some stomatitis was observed, which developed on the sixty-second day of the mercurial treatment.

ANTHRAX IN ENGLAND.—Anthrax is said to have broken out to a serious extent in a herd of cattle on Brotherton Marsh, Yorkshire, which Sir John W. Ramsden lets for grazing purposes.

COLOUR IN HORSES AND CATTLE.—According to the *Western Agriculturist*, the white colour of horses and cattle has been developed from tropical sources, and it is clearly shown by the superiority of the white horses of the desert, and the tendency of horses and cattle taken from the colder climates of the North to the hot climates of South America and our Southern States, that the grey colours increase and withstand the heat better. The grey horses are more popular in the Southern States and hot climates.

HOG CHOLERA.—The *Farmer's Review* of Chicago states:—News from Waterloo, Iowa, says that hogs are dying in great numbers from cholera in the southern part of the county, where the disease has broken out afresh. The townships of Lincoln, Orange, and Eagle are the affected districts. The same locality suffered severely from the ravages of the disease last spring. H. J. Lachty, a farmer in Orange township, has been the heaviest loser, only seven animals being left out of 350 he had three weeks ago. He estimates his loss at fully £300.

CATTLE DISEASE IN RUSSIA.—Revolt against constituted authority is reported from the south of Russia, resulting, as before, in the enforcement of the law and the pacification of the malcontents by means of ball cartridge fired among the mob. This time it was not opposition to the export of corn needed at home, but resistance to the prescribed action of the officials in taking measures against the spread of cattle disease. At Maikop, in the Cossack province of the Kuban, at the foot of the Northern Caucasus, it has become so bad that the authorities have had to interfere to destroy the affected beasts. General Yaskevich, assistant to the chief of the province, was sent to the spot with the necessary veterinaries. When the diseased animals were about to be killed the inhabitants showed determined opposition to the destruction of their cattle. The General attempted to pacify the crowd, but they only made still greater noise. A battalion of infantry Cossacks was then marched out to overcome the rioters. General Yaskevich once more addressed the people from the balcony of the house where he resided, and was greeted with a hail of stones. He finally ordered the Cossacks to fire into the rioters, which they did with deadly effect. Seventeen dead bodies remained on the ground, and as many more wounded dropped out of the retreating crowd.

MORTALITY AMONG SHEEP IN AUSTRALIA.—From Melbourne comes the following: We are hearing from more than one quarter of serious mortality among sheep. Recently a Lake Charm correspondent wrote requesting an opinion on "a disease in his sheep, involving a loss of all power in their hind legs, whilst a quantity of water and stuff ran out of the mouth and nose. Some of them are found to revive after lying down for forty-eight hours, but all that time they are unable to stand, although they try to do so, but the greater number die; they are on really good feed, principally barley grass and trefoil." A letter from "Acheron" narrates losses of quite an extensive character, says the *Australasian* of this city, and justly described as seriously alarming. "A sheep-owner in an adjoining district is stated to have lost as many as 3,000 in three weeks. I have been a loser to a less extent. Therefore, in hope of evoking further discussion on the matter, in order that light may be thrown on my present darkness, I beg to set forth symptoms of sheep so affected as observed by me: Dulness of eyes; running from eyes, and forming into a sort of glutinous matter in cavity below; on opening after death I invariably found them to contain a great quantity of water lodged about the bowels, etc.; instantaneous death, without the slightest apparent struggling, dropping dead whilst feeding. In other instances the sheep were fat, and to all outward appearances quite lively and healthy." These instances induce us to suggest that the matter should be investigated without loss of time. A fresh carcase might be sent down to the inspector of stock's department for veterinary examiation, or an officer (qualified) might visit the Acheron. The disease cannot be Anthrax nor yet Fluke. Until the nature of the disease has been determined it is impossible to devise either preventive or remedial measures. In the far western districts many ewes have been lost through want of feed during cold and wet weather, but in the cases above quoted feed has been good and abundant.

CATARACT IN PUG DOGS.—Dr. S. Johnson Taylor (Norwich) writes to the *British Medical Journal* of Sept. 19th: I was asked by a lady to-day to examine the eyes of her pug dog—four years old, well-nourished, healthy in all other respects, and with no history nor sign of accident or injury. I found in one eye complete, in the other almost complete, cataract, the pupils acting very freely to light and the eyes, apparently in all other respects, quite healthy. I am under the impression pugs are subject to this affection, but

should like to know if this is really the case, especially at so early an age, the animal exhibiting no other signs of senile decay and not said to be unduly voracious or thirsty, nothing suggestive of diabetes—to which disease again I am ignorant whether the canine race is subject. The animal is a great pet, but its existence in its present state cannot be altogether a happy one; it falls downstairs, runs up against articles of furniture, and can only find out food through its sense of smell, so that it would appear that it has nothing to lose and everything to gain from an operation; and I propose dealing with the worst eye first, performing dicission or simple linear extraction, but, as to what method of procedure is best, I should like the opinion of any of your readers who have operated upon cataract in the lower animals. The after-treatment might be a little difficult. I should think a strip of strong adhesive plaster, passing from upper or lower lids and keeping them firmly closed, would be the best, that is, if simple linear or other extraction were performed. Whether, if the operation were successful, the animal could be induced to wear glasses, I cannot say; they might be fixed in the frame of its muzzle. The proper glass could be easily determined by retinoscopy. Possibly someone sympathising with this spoilt darling may help me in my difficulty.

Correspondence.

ON THE HUMANE PREVENTION OF RABIES.

SIR,—During the late International Hygienic Congress, I attended steadily the sessions of Section III. on "The Relation of the Diseases of Animals to those of Man."

In the course of a discussion on the subject of Rabies, a suggestion was made that a resolution should be passed by the Section, and sent to Government, recommending measures for the prevention of Hydrophobia.

As two opposite methods of dealing with Rabies had been ably supported by Professors Roux and Fleming, I called attention to the fact that nothing had been said in the discussion of the sufferings necessarily inflicted upon animals where the Pasteur method, advocated by Professor Roux, was adopted; and I stated that in a Pasteur Institute dogs were kept in a state of madness. I therefore recommended that Municipal and County Regulations, with their excellent results, as shown by Professor Fleming, of London, and Professor Ostertag, of Berlin, should be adopted rather than Pasteurian methods.

In illustration of the sufferings of dogs, when made mad, I referred to my visit to the Rue Duphot on June 2nd, 1889, where, after inspecting the Hall of rabbits, guinea-pigs, and pigeons used in experiments for Rabies, Anthrax, etc., I went to the cages of three dogs also used for experiments in Rabies, who were in various stages of madness, one dying after its ten days' agony, a second in the full fury of madness, a third in frantic terror clinging to the bars of his cage, imploring to be let out.

Professor Roux's statement in opposition to my recommendation of the humaner methods of dealing with Rabies, seemed to infer that dogs were not rendered mad in a Pasteur Institute, or in dealing with Rabies. But when I stated to the Professor that I had myself seen this series of three dogs being made mad, he replied, "Oh, you might have seen a great many more, but they are not to inoculate people."

Now, it is well known from experience, that it is too dangerous to inoculate direct from the dog to the human being. But the fact that dogs are constantly made mad for experiment in the Pasteur Institute, or in any institute that adopts Pasteurian methods, should be honestly acknowledged, not evaded. The fact that this frightful disease of Rabies is kept up for purposes of experi-

ment, although the virus be transmitted in changed form through other animals for the inoculation of human beings, is in itself a grave fact, and it bears directly on the point which I dwelt on at the Congress, viz., that in choosing the method of protecting humanity from a rare but frightful disease, the method that does not involve severe sufferings to animals should be adopted by a Christian nation.

I have taken much interest in this Hygienic Congress—a Congress which has certainly shown that the future of medicine belongs to sanitation. But I am struck by the growing tendency in biological research to treat living and organic tissue as if it were inorganic, or what we call dead matter. Now I acknowledge the importance of biological research of close and trained observation, and also of experiment within rational humanitarian limits. But the possession of human reason involves the responsibility of guiding intellectual activity by the moral sense. Intellectual activity or curiosity, uncontrolled by the moral sense, is a danger to society. It may become not true science, but insanity and its practical result—medical manslaughter.

I say deliberately, that to continue to make dogs mad, thus perpetuating a fearful disease, and voluntarily producing in intelligent creatures a prolonged agony, so great that these tortured creatures will break their teeth, or smash their jaws in their frantic efforts to get free, is both intellectual folly and a crime against humanity, that should be forbidden by law.

August, 1891. ELIZABETH BLACKWELL, M.D.

DISEASED MEAT.

DEAR SIR,—Reading in the *Lancet* an account of the proceedings of the "Hygienic Congress," it occurred to my mind that much diseased meat finds its way to the London market, *via* the "Dropped-meat Salesman," or small butchers in the country. To wit, a cow dies from Tuberculosis or "Cancer"; she is sold to a butcher for thirty shillings. She disappears, frequently at night. Few people know where she goes, but some are in the "know." She—or rather the carcase—is soon in London town, and a cheque comes back by return for quite a large amount. I am told that as much as eight or nine sovereigns are frequently gained *on each carcase* by these little butchers. Now for the remedy. Could not the veterinary surgeon report the death to a Sanitary Inspector? But it is not an easy matter to suggest a remedy. Perhaps some sharper wits than mine can point out the *modus operandi*.

August 27th, 1891. "BEEF SAUSAGES."

THE ETIOLOGY OF SURRA.

SIR,—Having carefully read Dr. Ranking's most interesting communication on "Surra" in your June number, I consider it only just to the members of our profession to explain to them that they should receive his conclusions with the greatest reserve.

We have been much indebted to members of our sister profession for a great deal of our present knowledge, and are always glad of a helping hand in the investigation of an obscure disease, but the investigator should have considerable knowledge of all points of his subject before he issues his deductions to the public. He should severely test his theories before publishing them in the journals. Fortunately, by scientific research we have also been able to help our sister profession in dealing with contagious disease.

Dr. Ranking, according to his own admission, has not had many cases of Surra under his own personal care, but has evidently tried to make his observations correspond with his theory. His descriptions of the symptoms

of the disease and the microscopical appearances of the blood are graphic, and in accordance with what has been frequently noticed, but his scientific deductions have been disproved by his own showing; *vide* "Inoculation of the Organism," page 403.

Inoculation ought to reproduce the disease in a healthy subject, and so on in succession; the disease in each case being similar. In none of Dr. Ranking's subjects was the affection reproduced.

With regard to Surra I may claim to speak with some authority, having investigated the disease in Kohab, in the Punjab (*vide* my report to the P.V.S. in India, 17th September, 1886), and in Burma, where I have had a very large experience of it. Any one having the opportunity, and who feels interested in the disease, may prove the following statements for himself.

1. In a case of relapsing fever where the lesions indicate the disorder to be that known as "Surra," and where the thermometer registers 103° F. or higher, the parasite—Hæmatomonas Evansi—will invariably be found.

2. Having ascertained that the parasite is in the blood, take a few drops and inject them into the jugular vein of another animal known to be free from the disease. In three days a drop of blood extracted from any part of the animal will be found to contain numerous similar parasites.

3. These inoculations may be carried out successively with similar results.

4. The duration of the disease is on an average fifty-two days, and has been invariably fatal.

The above will, I think, clearly prove that the relapsing fever known as Surra is caused by the presence of Hæmatomonas Evansi in the blood, and not by the Plasmodium Malariæ. On page 400, Dr. Rankin mentions that he has only observed one Hæmatomonas. In explanation, I would point out that it is only when the temperature is high, that the parasites are mature and vigorous, and therefore readily seen in the blood. During the intervals between the periods of increased temperature, however, many spores such as Dr. Rankin mentions may he seen attached to and between the blood corpuscles. Many of these are no doubt the ova of the Surra parasite, as at certain stages I have observed them, under a $\frac{1}{12}$ oil immersion object glass, move about freely, the movements being due to the flagella. I have carefully tried to cultivate the organism in the various media used in bacteriology, but have always failed. No results having followed, Dr. Ranking's experimental inoculations must prove to him that his deductions have been erroneous, as the introduction of infected blood into a healthy circulation will without fail reproduce the fatal relapsing fever. Should he in his investigations discover a remedy for this fatal affection, he will indeed earn the gratitude of all lovers of animals, and his observations may disclose something of the nature of the fatal fever which attacks human life in Burma.

W. D. Gunn, A.V.D.,
Senior Veterinary Surgeon, Burma.

VENTILATION OF STABLES.

Sir,—In your September issue, I note that this subject was brought before the S.C. Veterinary Medical Association by Mr. Goodall, and with some of his remarks I propose to deal.

He says, "The air on the floor or close to the floor of a stable contains more carbonic acid than it does higher from the ground." I presume he founds this opinion more on the greater density of that gas as compared with air, than on any determinate experiment; in my experience, the rule is, the reverse obtains. We are all aware that volume for volume

CO_2 is heavier than atmospheric air, but that its degree of expansion is greater, and that it rises in excess of proportion with every degree it increases in temperature; exhaled from the lungs its temperature is much higher than the surrounding air, so that it is lighter rather than heavier. If by its density it did take a downward direction the ammonia in the sub-air with the spores and excrementitious halitus would send it upwards. It seems to me that Mr. G. is imbued with the idea that the air of a stable is like the leaves of a book—one volume above another, and I cannot reconcile this with any sound notion of the law of diffusion.

By that principle is understood the intermingling of two gases together in spite of a difference in specific gravity, without any tendency to chemical combination, and with little if any disposition—none under ordinary circumstances—to again separate. As a proof test the admixture of CO and H, the first being in the lower vessel, and H in the higher, and, although there is even a greater disparity between their specific gravity than there is between ether and mercury, in a few minutes, without heat or agitation, the two gases will be found commingled. How about the CO_2 being at or near the floor, especially when there are causes in operation for its movement upward, apart even from this law of diffusion. The halitus given off from the ordure, as we have shown has a tendency upwards, and this is increased by the commingling of ammonia, which at the same temperature is little more than half the weight of air, and one third that of CO_2. The system of window ventilation advised is "hit or miss," for arrange it however you may, the ingress and egress currents will be common to both openings; if windy, owing to outside baffling, be inoperative at both, and occasionally we cannot escape a violent ingress. Perhaps it may be well that Mr. G. and I are not as one on the question of what is a draught? The passage of air into, through, or out of an apartment at such velocity or in such volume as to be perceptible, in my opinion constitutes a draught sufficient to be injurious.

The louvre roof is an old style of ventilation, and is fairly effective, but has objectionable features. If common to the chamber over the stable, and there generally is one, the used air from the animals below contaminates the forage; if the air is carried up by a central shaft or by wall shafts the area is decreased, and the place rendered unsightly; more, with the ordinary louvre there is always more or less down-draught.

But it is not the high or egress openings that are as objectionable as the low or ingress ones. Imagine two openings close to the ground opposite each other, what of necessity happens? A strong current passes through, disturbing by its velocity the volume of air up to and around the horse; if this is not draught what is it? It would at all events be useful in augmenting the number of our patients; whether the recommendation of such a plan would redound to our credit scarce need be asked. There are many of us that would scarce venture on this low ventilation on account of cracked heels and stocked legs if a frosty night follow a dirty day and the legs have been washed and dried. I imagine, although I have as good a stable aid as can be found, I should scarce escape cracked heels in the morning. Mr. G. says he has proved cold air comes in at the low openings. This none will dispute, but most of us have "proved" that cool air enters equally as well higher up, and that it is better quality I will try to show. The air at the lower stratum next to buildings is more or less tainted, either from outside drains, drainage for manure or unavoidable collections of water, and it is this that would be introduced to recruit the exhausted air in the interior of the stable.

I am rather in a fog about the "periodical vacuum." I can quite understand that, without a due allowance for diffusion and for higher temperature, it may be imagined that CO_2 being heavier than air will remain at the

bottom unless driven up by a force from below, and that unless some power of ascension is in force, a downcast will occur from the louvre, but that it creates a periodical vacuum I cannot see.

I hold that for true ventilation you have no need to fall back upon doors, windows, or louvre roofs. Two scientific openings close together, one ingress and the other egress, can be so constructed as to clear the foul air out of the stable, and introduce sufficient cool air into it, and the apparatus can be so arranged that the currents are separate and distinct and not interchangeable, and further there is no draught. This can be affixed in the wall without necessity for louvre or shafts, or low ventilators that would keep our animals in continual discomfort, that must ultimately result in disease. Of my method of ventilation, I propose, with your permission, to speak further.

W. G. R. A. Cox.

Newcastle-on-Tyne, September 10.

A CORRECTION.

Sir,—In the treatment of the case of Emprosthotonos recorded in the Journal for September, I am, by an error, made to give an ounce of iodide of potassium, which should read one drachm.

I shall be obliged if you will kindly insert correction.

Koskashefka, Kieff, *Sept.*, 1891. Iles Matthews.

Communications, Books, Journals, etc., Received.

Communications have been received from W. D. Gunn, A.V.D., Burma; "Beef-Sausages"; G. Gartside Mayor, Kirkham; W. E. Matthews, Stawell, Victoria; J. H. Frink, St. John's, New Brunswick; W. A. Hancock, Newcastle-on-Tyne; E. Blackwell, M.D., London; Professor Crookshank, London; R. W. Burke, A.V.D., Amballa, India; Professor Williams, Edinburgh; J. A. Meredith, A.V.D., Leeds; W. G. R. A. Cox, Newcastle-on-Tyne; S. Locke, Manchester; H. J. Dawes, West Bromwich; E. B. Vanderplank, Maritzburg, Natal; W. Awde, Barnard Castle; W. H. Hoskins, Philadelphia; J. Matthews, A.V.D., Moscow; A. W. Hill, London; P. R. Gordon, Brisbane, Queensland; E. L. Dixson, Margate.

Books and Pamphlets: *M. H. Hayes*, Veterinary Notes for Horse-Owners; Bulletin of the Johns Hopkins Hospital; *M. H. Hayes*, Riding on the Flat and across Country; *P. Cagny*, Precis de Therapeutic, etc., Veterinaires; *Mayhew and Lupton*, Illustrated Horse-Doctor; *S. S. S. Gilani*, The Principles and Practice of Bovine Obstetrics (in Urdu); *Drs. Boschetti and Bassi*, Fleming's Trattato di Ostetrica Veterinaria (15 dispensa); *A. Koch*, Encyklopadie der Gesammten Thierheilkunde und Thierzucht (Band ix., Lieferung 3); Proces-Verbal de l'Academie Royale de Medecine de Belgique; Royal Geographical Society's Proceedings; Proceedings of the National Veterinary Association; Bulletin des Seances de la Societe Nationale d'Agriculture de France; Bulletin et Mem. de la Soc. Cent. de Med. Veterinaire; Johns Hopkins Hospital Reports.

Journals, etc.: *Bacteriological World; Recueil de Med. Veterinaire; Repertorium der Thierheilkunde; Agricultural Economist; Indian Veterinary Journal; Journal of the Society of Arts; Journal de Med. Veterinaire et de Zoo'echnie; Annales de Med. Veterinaire; Thierarzt; Echo Veterinaire; Moderno Zooiatro; Revue Veterinaire; Clinica Veterinaria; Deutsche Zeitschrift fur Thiermedecin und Vergleichende Pathologie; American Veterinary Review; Journal of Comparative Medicine and Veterinary Archives; Australasian Veterinary and Live Stock Journal; Repertoire de Police Sanitaire Veterinaire; Live Stock Journal; Lancet; Mark Lane Express; Edinburgh Medical Journal; Medical Press and Circular.*

Newspapers: *Lahore Civil and Military Gazette; Bombay Gazette; Morning Post.*